

ADF&G TECHNICAL DATA REPORT NO. 150
(Limited Distribution)

STATE OF ALASKA
Bill Sheffield, Governor



REVISED ANADROMOUS STREAM CATALOG OF SOUTHEASTERN ALASKA

District 106

Northeast Coast of Prince of Wales Island

Subdistricts 106-30 and 106-10

Volume I

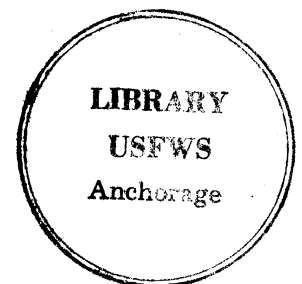
By:
John R. Edgington
James P. Cariello
and
Craig A. Burns

July 1985

US FISH & WILDLIFE SERVICE--ALASKA



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ALASKA DEPARTMENT OF FISH AND GAME
Box 3-2000, Juneau, Alaska 99802

Don W. Collinsworth
Commissioner

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ADF&G TECHNICAL DATA REPORTS

This series of reports is designed to facilitate prompt reporting of data from studies conducted by the Alaska Department of Fish and Game, especially studies which may be of direct and immediate interest to scientists of other agencies.

The primary purpose of these reports is presentation of data. Description of programs and data collection methods is included only to the extent required for interpretation of the data. Analysis is generally limited to that necessary for clarification of data collection methods and interpretation of the basic data. No attempt is made in these reports to present analysis of the data relative to its ultimate or intended use.

Data presented in these reports is intended to be final, however, some revisions may occasionally be necessary. Minor revision will be made via errata sheets. Major revisions will be made in the form of revised reports.

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REVISED ANADROMOUS STREAM CATALOG OF SOUTHEASTERN ALASKA

District 106

Northeast Coast of Prince of Wales Island

Subdistricts 106-30 and 106-10

Volume I

By

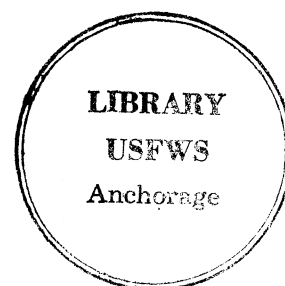
John R. Edgington

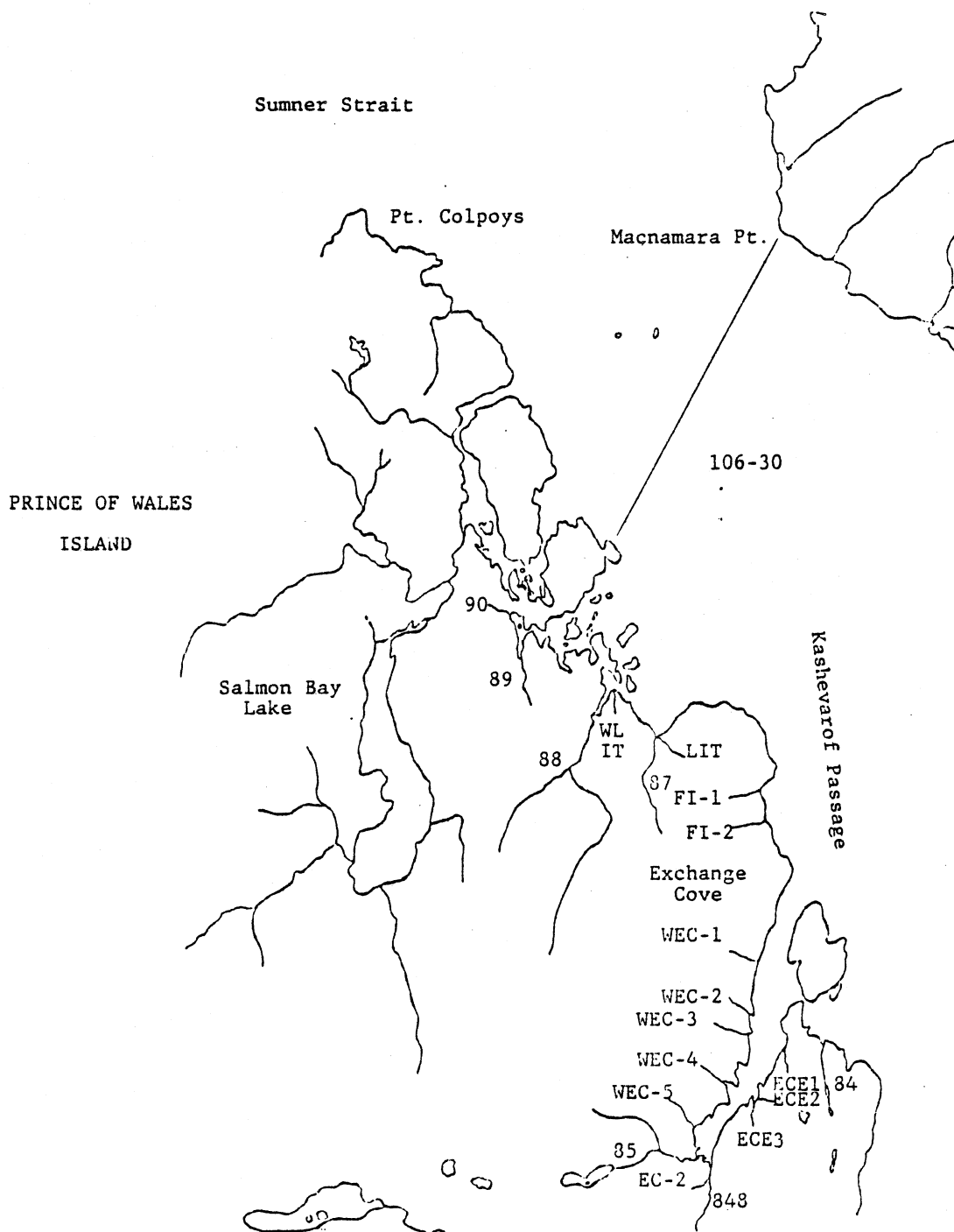
James P. Cariello

and

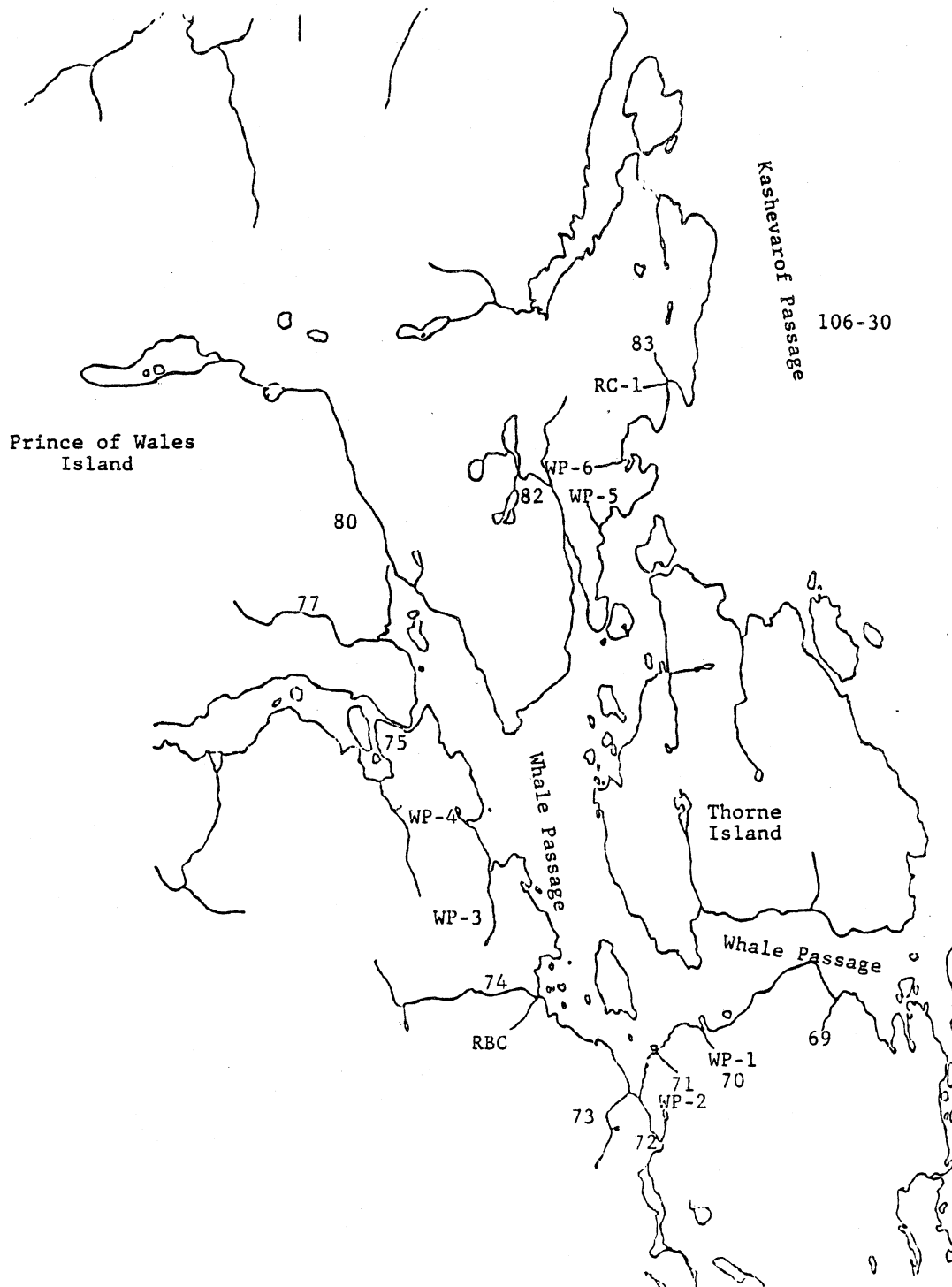
Craig A. Burns

July 1985





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LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length --
3. Historical Fish Species

Part II.

1. Stream Name Recon Cr. 2. ADF&G Catalog No. 106-30-090
3. Latitude 56°16'15" Longitude 133°09'10"
4. Agency Unit 05 5. Mgmt. Area 534.1K 6. USGS Map No. Petersburg B-4
7. Aerial Photo No. 1979 Photo Fl. Ln. 22 Photo 149
8. Bay/Drainage Clarence Strait 9. Access 2
10. Present Land Use None
11. Historical Land Use None
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 2.5 cfs 14. Flow Stage 2
15. Stream Temperature 12° 16. pH 7.5 17. Beaver No
18. Temperature Sensitivity No
19. Barrier Yes, velocity 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 100% Gravel/S. Cob. -- %
L. Cob/Boulder/Bedrock -- %
B. Gradient 1 %
C. ASA % None
D. Schooling Yes
E. Shellfish None observed
F. Anchorage Skiff; only at high tide.

22. Comments

Stream Evaluation

This stream is located in the northwest corner of a group of islands immediately south of Salmon Bay. The stream has 600 meters of good ITZ rearing through a grass meadow in which coho and trout fry were observed. However, there was no ASA nor were fish observed in the stream. The mouth of the stream has stream flow over moss encrusted bedrock. After 50 meters of 4% gradient, the stream enters a bedrock V-notch with a 15% cascade for 20 meters. Above this cascade, the stream displays the characteristics of a muskeg drainage for 250 meters: dark tan water quality; slow flow with forbs in the stream; muck/gravel substrate; and so on.

23. Investigators Gerry Merrigan 24. Date 6/28/83

Recon Creek
106-30-090



1. Shallow intertidal rearing slough containing
SS/DV fry.



2. Mouth of stream where the ITZ rearing slough
ends and stream flow over bedrock begins.

Recon Creek
106-30-090



3. Habitat below cascade, 30 meters from mouth.
Stream flow over boulder/bedrock.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A & B 2. Section Length 100 m
 3. Historical Fish Species PS

Part II.

1. Stream Name 2nd S. of Salmon Bay 2. ADF&G Catalog No. 106-30-89
 3. Latitude 56°15'28" Longitude 133°08'54"
 4. Agency Unit 05 5. Mgmt. Area 535 K 6. USGS Map No. Petersburg B-4
 7. Aerial Photo No. 79-22-148
 8. Bay/Drainage Clarence Strait 9. Access non-trailed
 10. Present Land Use logging; unit borders right bank, 600 m.
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 2.5 cfs 14. Flow Stage 2
 15. Stream Temperature 12.0°C 16. pH 7.8 17. Beaver no
 18. Temperature Sensitivity no
 19. Barrier no 20. Weather 1

Part III.

21. Intertidal

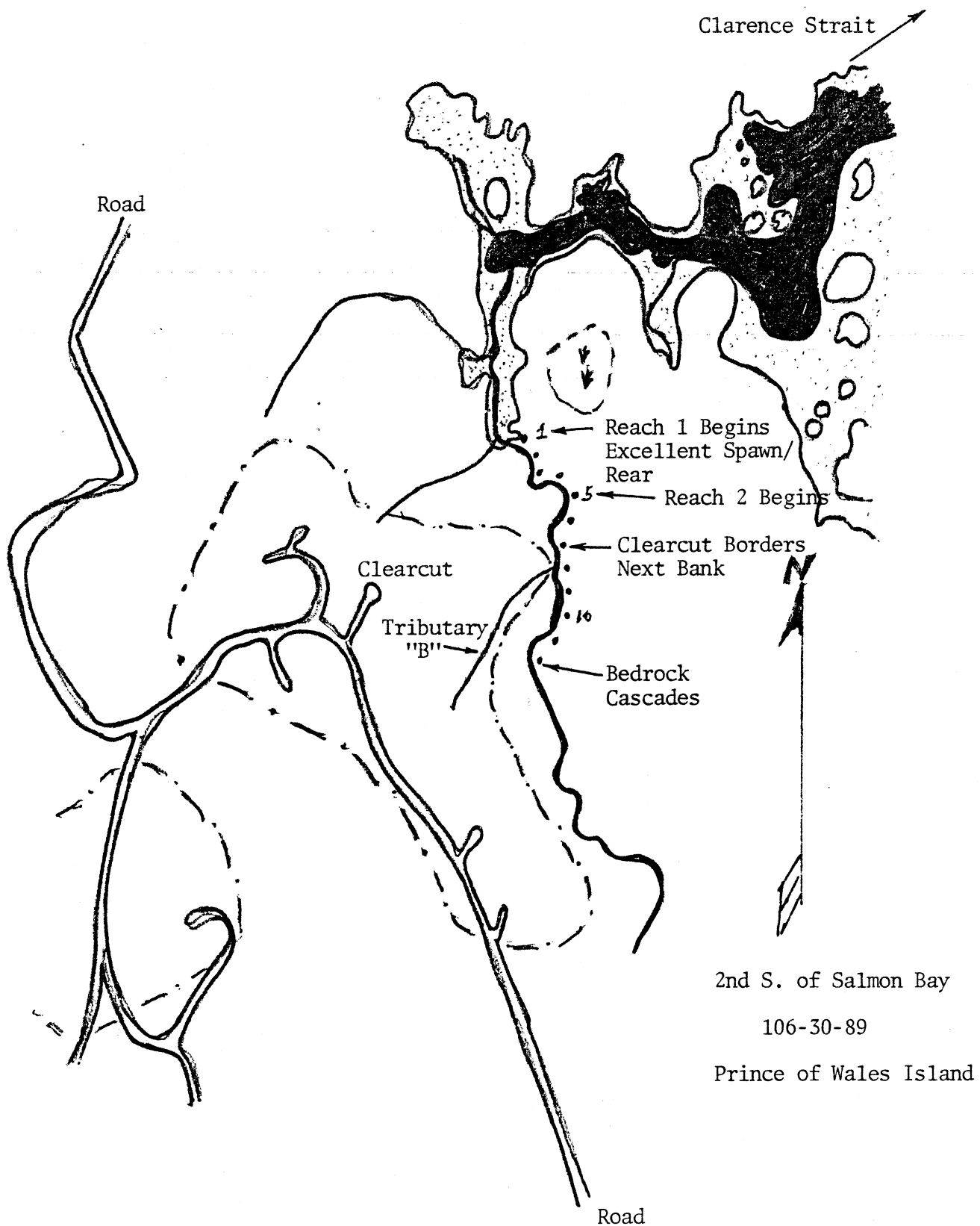
A. Substrate: Fines 65 % Gravel/S. Cob. 20 %
 L. Cob/Boulder/Bedrock 15 %
 B. Gradient 1.0 %
 C. ASA % 5/good
 D. Schooling Clarence Strait & in lagoon
 E. Shellfish " " " "
 F. Anchorage Clarence Strait

22. Comments

Stream Evaluation

Slough-like IT channel with moderate instream vegetation provides excellent summer rearing for juvenile SS. Substrate is predominantly fines, however, the upper ITZ contains several gravel/cobble riffles. Reach 1 is characterized by gravel/sand "pools" connected by riffles. Overhanging vegetation, instream forbs, and debris are copious. Rearing is generally excellent. Reach 2 is delineated by a substrate/gradient change and the channel is generally reduced in width. Debris loading increases dramatically in the vicinity of a cutting unit, providing rearing cover but accelerating bank cutting and "fines" deposition. ASA is reduced and patchy. A small tributary enters the main stem in Reach 2, Section 8: 50m; via the right bank.

23. Investigators Mickowski/Merrigan 24. Date 6/28/83





1. Stream mouth lies at the head of an extensive intertidal slough.

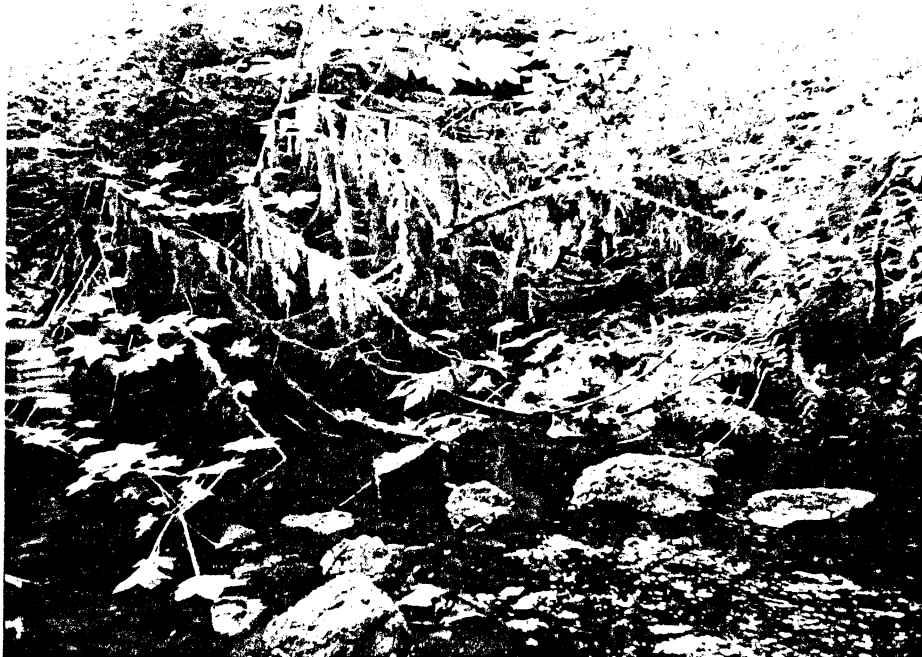


2. The upper ITZ is characterized by gravel riffles and a vegetative transition of marsh grass to timber.

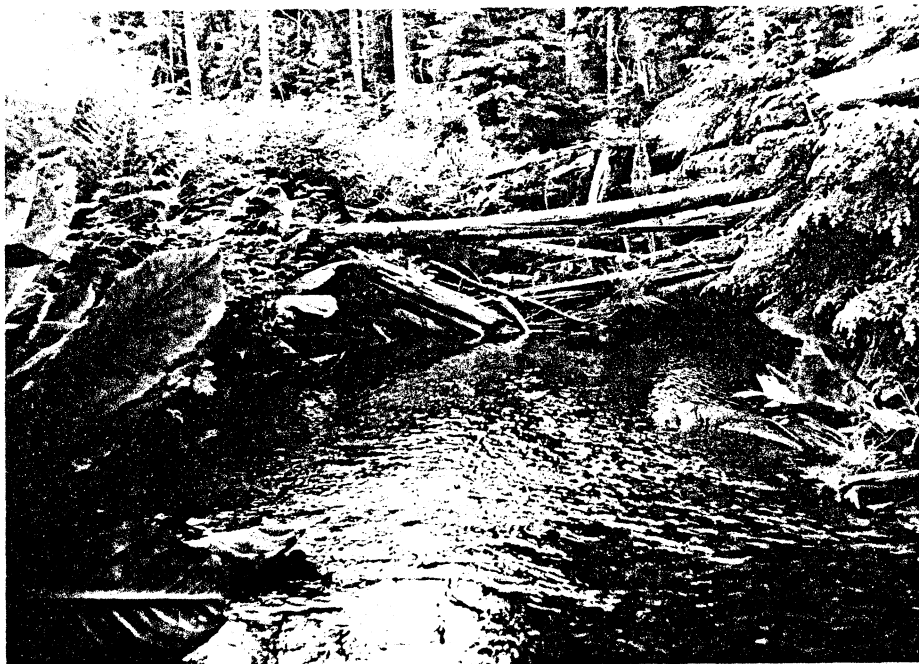
106-30-89



3. Section 1: Gravel riffles, SS pools, and copious blowdown provide excellent spawning and rearing habitat.



4. Section 5: Gradient and substrate size increasing; overhanging dense vegetation.

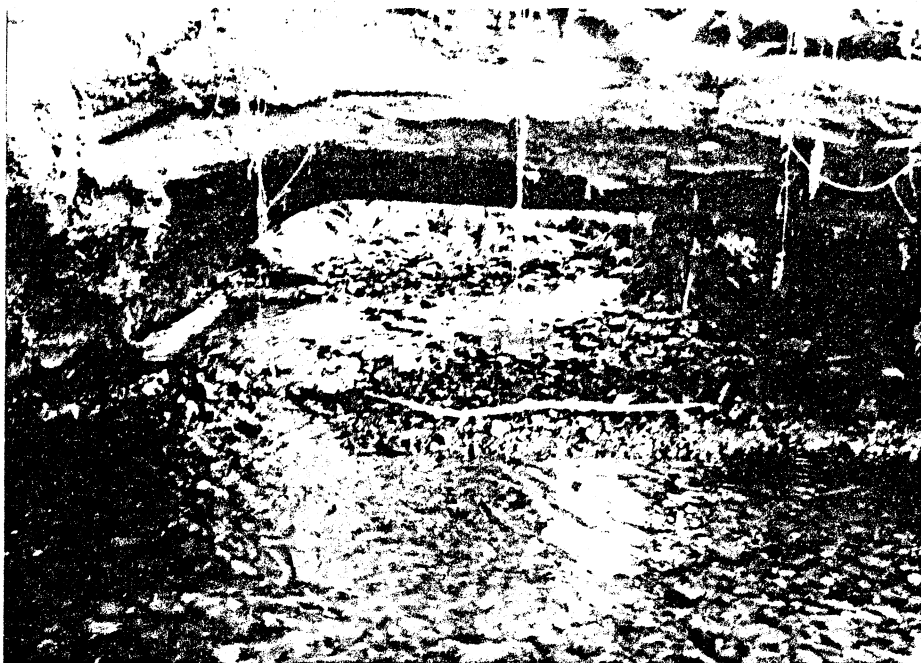


5. Downstream view of copious instream logging debris and the right bank unit boundary.



6. Section 9: 60m; Stream has characteristics of a muskeg drainage.

106-30-89



7. Mouth of Tributary "B" entering main stem at
Section 8: 50m.



8. Section 1: Tributary "B" with low velocity
flow through clearcut.

106-30-89

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	7.0	15	105					
2	100	6.5	8	52					
3	100	7.5	12	90					
4	100	4.5	8	36					
5	100	3.5	2	7					
6	80	3.5	5	14					
7	100	3.0	4	12					
8	100	6.0	7	42					
9	100	3.0	4	<u>12</u>					
Area A Total				370m ²					
1	100	2.0	12	24					
Area B Total				<u>24m²</u>					
Total ASA				394m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name n/a 2. ADF&G Catalog No. 106-30-89

Reach Number	1	1	1	1	2	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	80	100
3. Compass Bearing	187	169	164	167	234	213	196
4. Gradient	1.0	1.0	1.0	1.0	2.5	1.5	1.5
5. Water Quality	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6. Bank Type	2	2	.5	.5	.5	.5	2
7. Bank Stability	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1-5
9. Debris Loading	10	10	15	10	30	25	20
10. Undercut Bank Length	--	30	--	--	--	--	23
11. Stream Width:							
Channel	9.0	10.0	10.5	5.5	3.5	5.0	3.0
Water	*	6.5	7.5	4.5	3.5	3.5	3.0
12. Water Type %: SS	80	85	80	80	60	60	45
DS	--	--	--	--	--	--	25
SF	20	15	20	20	40	40	30
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	15	5	--
Boulder	1	1	1	1	10	5	5
Large Cobble	--	--	--	--	15	15	10
Small Cobble	14	9	14	19	20	35	20
Gravel	70	75	70	65	30	30	35
Sand	15	15	15	15	10	10	15
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	15
14. ASA %/Quality	15/3	8/3	12/3	8/3	2/3	5/3	4/2
15. Rearing Area %	20	30	30	30	20	20	50
16. Pool Cover %	30	30	30	30	30	30	20
17. Riffle Cover %	--	--	--	--	10	10	20
18. Fish Observed (fry) SS	>100	>12	>25	>25	>12	>12	>12
(fry) DV			1	1	1		
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1&2: Copious debris/fines. Instream forbs common.

Section 3&4: Copious debris/fines. Overhanging vegetation (dense).

Section 5: 50m; Substrate change. Typically boulder/cobble with pockets of gravel between. Dense debris and overhanging vegetation.

Section 6: 80m; Logging unit borders right bank; debris abundant including root wads and sawed logs.

Section 7: 90m; Debris jam.

22. Investigators Mickowski Date 6/28/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name n/a 2. ADF&G Catalog No. 106-30-89

Reach Number	2	2	2	2	2		
1. Section Number	8	9	10	11	12		
2. Section Length	100	100	100	100	100		
3. Compass Bearing	179	104	114	159	164		
4. Gradient	1.5	2	2	2	3		
5. Water Quality	1/1	1/1	1/1	1/1	1/1		
6. Bank Type	2	2	2	2	2		
7. Bank Stability	2(1)	1(2)	1(2)	1(2)	1(2)		
8. Bank Vegetation	1-5	1,3-5	1,3-5	1,3-5	1,3-5		
9. Debris Loading	14	6	2	5	2		
10. Undercut Bank Length	15	15	--	--	--		
11. Stream Width:							
Channel	7.2	5.2	2.4	2.8	5.2		
Water	6.0	3.0	2.0	2.2	2.4		
12. Water Type %: SS	40	40	25	30	35		
DS	20	20	--	20	10		
SF	40	40	75	50	55		
DF	--	--	--	--	--		
13. Substrate %:							
Bedrock	--	--	10	10	15		
Boulder	5	15	20	20	35		
Large Cobble	15	25	35	35	30		
Small Cobble	20	35	20	20	20		
Gravel	30	20	15	15	--		
Sand	15	5	--	--	--		
Muck	--	--	--	--	--		
Other (organics)	15	--	--	--	--		
14. ASA %/Quality	7/2	4/2	--	--	--		
15. Rearing Area %	35	25	10	25	15		
16. Pool Cover %	15	20	10	25	15		
17. Riffle Cover %	10	15	5	5	--		
18. Fish Observed (fry) SS	>12	>12	--	--	--		
19. Sampling	N	N	N	N	N		
20. Potential Barriers	N	N	N	N	N		
21. Enhancement/Rehab	N	N	N	N	N		

Section 8: 50m; Unit no longer along right bank; mature stands, both banks.
Instream forbs common. Tributary "B" enters via right bank.

Section 11: 50m; Bedrock cascades.

No fish were observed above Section 9. Survey was discontinued due to lack of fish and scarcity of habitat.

22. Investigators Merrigan Date 6/28/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Tributary "B" 2. ADF&G Catalog No. 106-30-89 "B"

Reach Number							
1. Section Number	1	2					
2. Section Length	100	50					
3. Compass Bearing	244	269					
4. Gradient	2	4					
5. Water Quality	1/1	1/1					
6. Bank Type	2	2					
7. Bank Stability	1(2)	2(2)					
8. Bank Vegetation	1-5	1-5					
9. Debris Loading	10	11					
10. Undercut Bank Length	15	--					
11. Stream Width:							
Channel	3.1	2.6					
Water	2.0	1.0					
12. Water Type %: SS	30	30					
DS	10	--					
SF	60	70					
DF	--	--					
13. Substrate %:							
Bedrock	--	--					
Boulder	5	15					
Large Cobble	15	25					
Small Cobble	25	35					
Gravel	35	20					
Sand	10	5					
Muck	--	--					
Other (organics)	10	--					
14. ASA %/Quality	12/2	--					
15. Rearing Area %	20	10					
16. Pool Cover %	15	15					
17. Riffle Cover %	5	15					
18. Fish Observed	N	N					
19. Sampling	N	N					
20. Potential Barriers	N	N					
21. Enhancement/Rehab	N	N					

This small tributary enters the main stem via the right bank and proceeds to meander through a logging unit for 150 meters before beginning a rapid ascent. Spawning and rearing habitat is concentrated near confluence.

22. Investigators Merrigan Date 6/28/83

PEAK ESCAPEMENT RECORD

2nd S. of Salmon Bay
106-30-89

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
8/12/80	40			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A & B 2. Section Length 100 meters
 3. Historical Fish Species PS, CS

Part II.

1. Stream Name First West Lava Cr. 2. ADF&G Catalog No. 106-30-088
 3. Latitude 56°14'50" Longitude 133°07'32"
 4. Agency Unit 05 5. Mgmt. Area 535K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 23 Photos 16-18
 8. Bay/Drainage Kashevarof Passage 9. Access 1
 10. Present Land Use Active logging and roading in upper watershed.
 11. Historical Land Use None
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 20 cfs 14. Flow Stage 2
 15. Stream Temperature 12.5 16. pH 7.7 17. Beaver Yes
 18. Temperature Sensitivity Yes; left fork is clearcut, right fork is beaver impounded.
 19. Barrier No 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 20% Gravel/S. Cob. 45 %
 L. Cob/Boulder/Bedrock 35 %
 B. Gradient 1.5 %
 C. ASA % Fair in middle ITZ; good in upper ITZ.
 D. Schooling Yes, in upper ITZ.
 E. Shellfish Moderate in lower ITZ.
 F. Anchorage In Bay; extensive tide flat.

22. Comments

Stream Evaluation

The stream has a large ITZ with moderate ASA and schooling areas. The initial reach of the stream is primarily a V-notch with little fish habitat. Above this area, the habitat greatly improves. The stream then forks, the right fork being primarily beaver influenced. The left fork enters a clearcut (c. 1978) where the stream temperature increases to 19°C and heavy debris concentrations cause braiding. The stream leaves the unit and gradually increases in gradient until it enters a steep bedrock V-notch, marking the end of the survey.

23. Investigators Merrigan and Mickowski 24. Date 6/27/83

First West Lava Creek
106-30-088
Reach Analysis

ITZ

The lower ITZ is a large mud flat with moderate amounts of shellfish. Deer sign was heavy across the tide flat. The middle portion of the ITZ has a grass meadow with rearing sloughs on the right bank. Fair spawning area is here though somewhat compacted. The upper ITZ runs through a grass meadow with numerous rearing sloughs. A small stream (see W. Lava IT Cr.) enters through the meadow from the left bank. Two deer were sighted on a gravel bar below the mouth. There is exposed bedrock and blue clay deposit about 50 meters below the stream mouth. A schooling area is also present just below the mouth. However, no fish or fry were observed in the ITZ.

Survey Area "A": Main Stem

Reach I: 600 m

The transition in habitat from ITZ to stream is quite abrupt. Heavy fines and small cobble with moderate ASA gives way to a bedrock/boulder V-notch with little fish habitat. A dense algal growth occurs on the bedrock. Small amounts of coho and trout fry were observed.

Reach II: 700 m

The stream emerges from the V-notch and broadens out into cobble/gravel riffles with good spawning and rearing habitat. Debris jams and fines deposition scattered through the upper portion of the reach. Increased concentrations of coho fry were observed. The reach ends with the confluence of Tributary "B" in the right bank.

Reach III: 700 m

Above Tributary "B", the main stem enters a clearcut that was harvested approximately in 1978. A road crossing via a log stringer bridge occurs early in the reach. Logging roads parallel the stream though about 100 meters distant from the stream channel.

Throughout the reach there is a considerable amount of instream fines and debris. Large debris jams, formed principally with stump root wads and buffer strip blowdown, often cause braiding and channel migration. This in turn results in aggravated bank instability and more blowdown. The width of the post logging buffer strip varies from 0 meters to 30 meters, usually involving 0 - 3 trees from the bank which is hardly adequate. Water temperature increased to 14°C and a heavy algal deposition occurs on the substrate in an area immediately above the bridge where there is zero canopy coverage. Heavy concentrations of coho fry were observed in this reach.

First West Lava Creek
106-30-088
Reach Analysis

Reach IV: 300 m

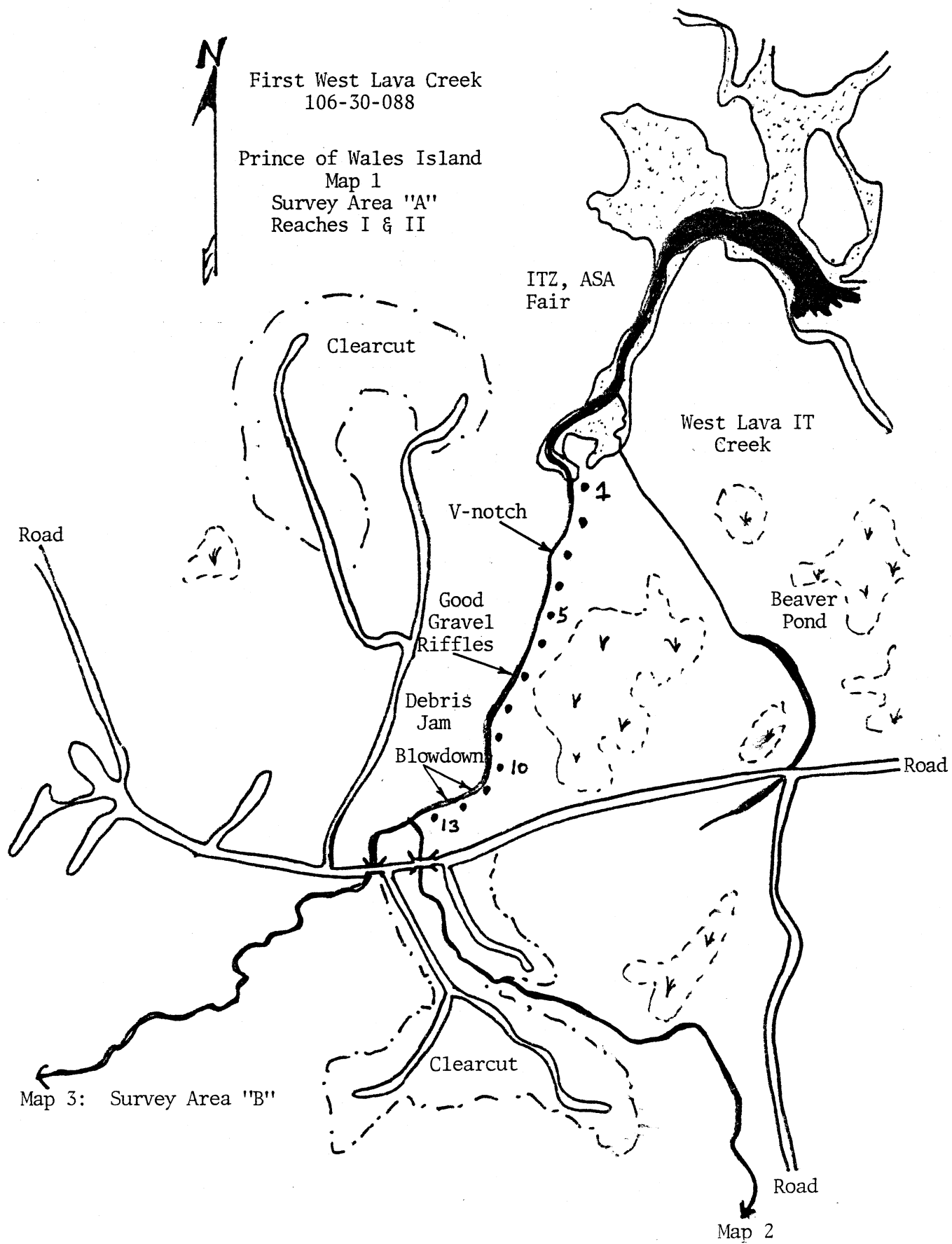
The main stem leaves the unit and enters old forest growth. The unit is approximately 100 m distant from the right bank and the remnant buffer strip appears stable. Substrate size, gradient, velocity, and bank slope gradually increase through the course of the reach. Conversely, ASA and fish observations decrease. There is a midstream island forming two channels for 100 meters, each with isolated debris jams. Moderate amounts of coho fry were observed.

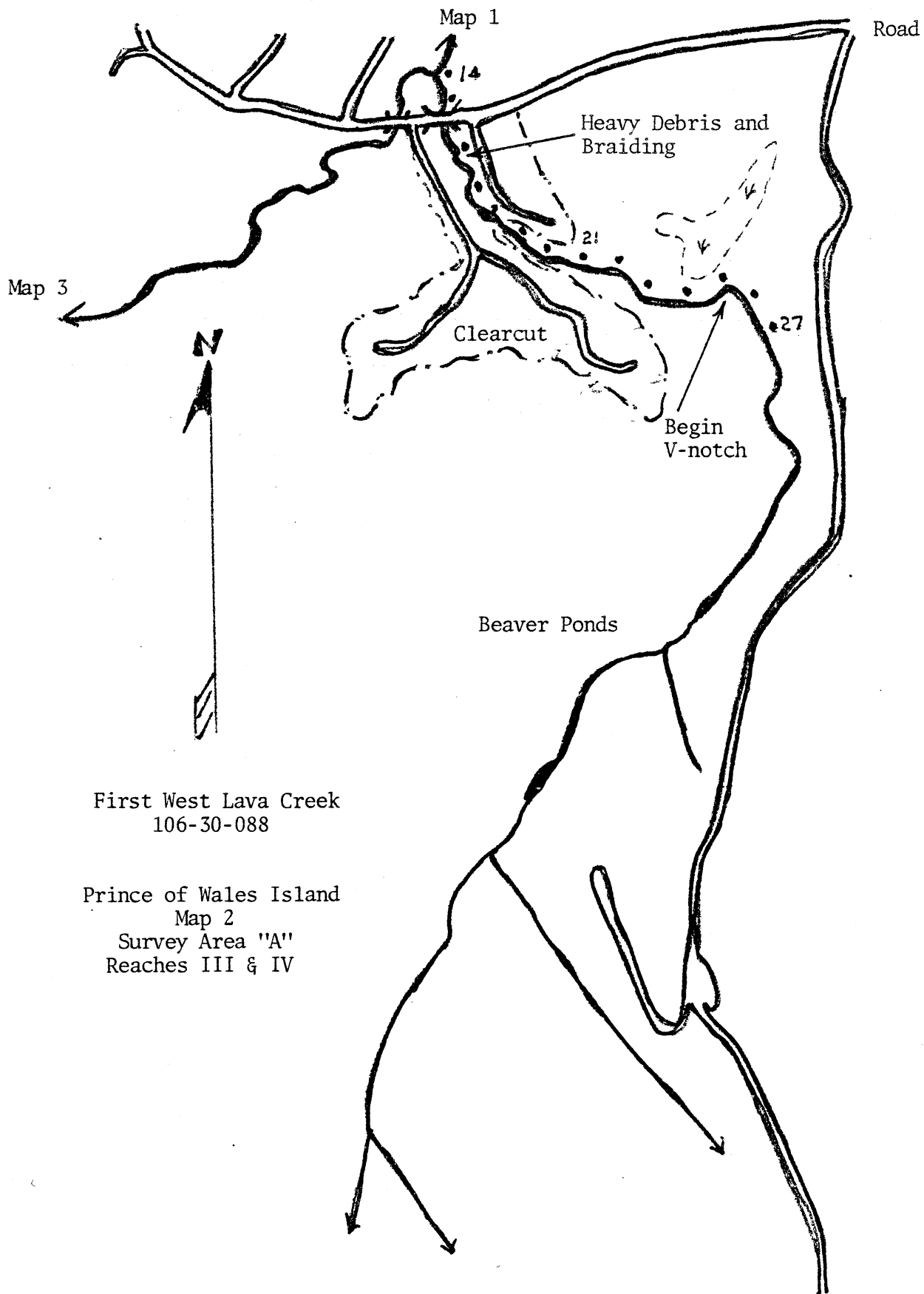
Reach V: 400 m

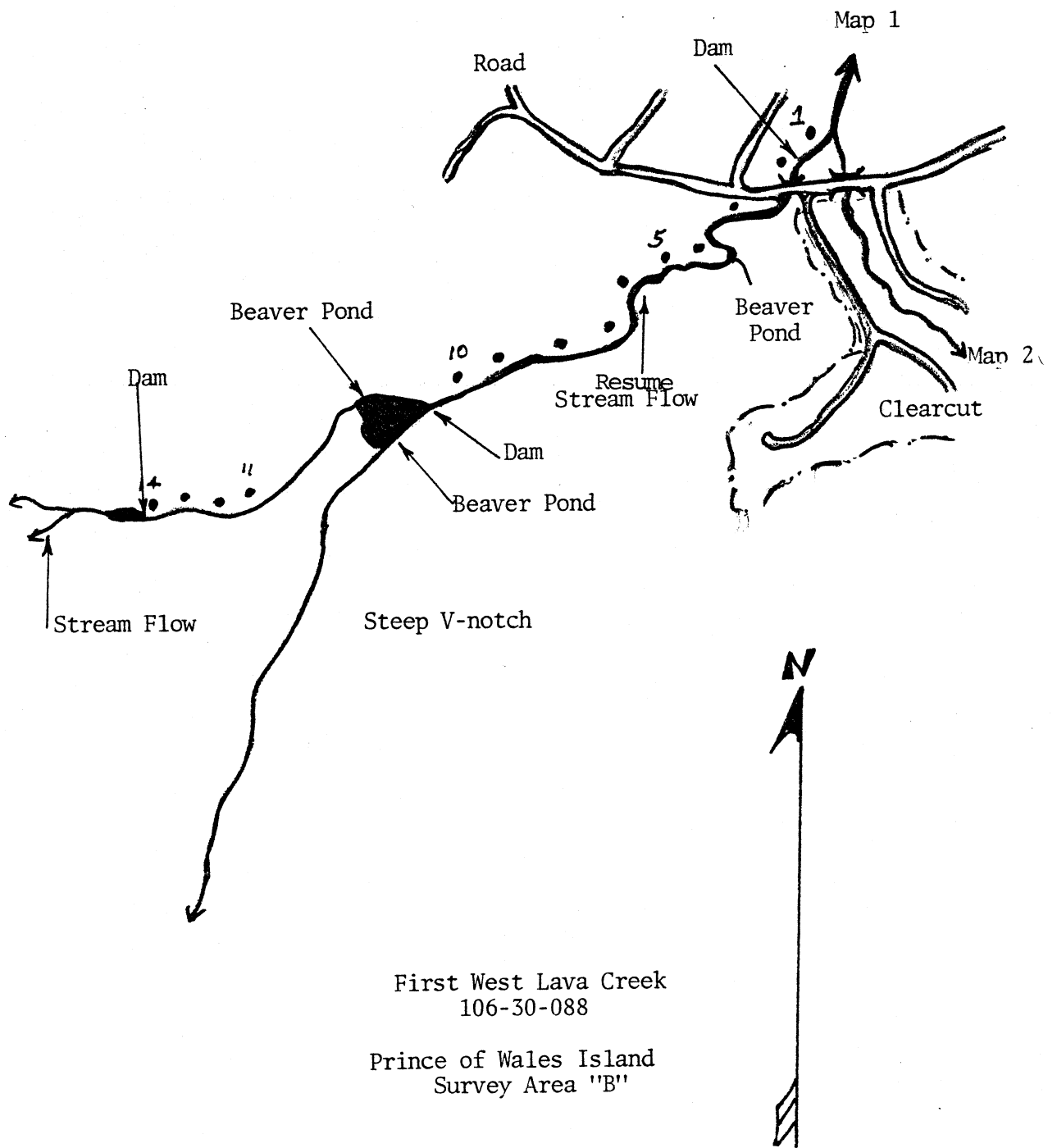
Stream gradient climbs steadily over a bedrock/boulder substrate and ultimately enters a V-notch. Survey terminated after habitat ends. Lack of fish observations; increasing gradient to 10%.

Survey Area "B": Tributary entering Main Stem; Section 14: 0m.

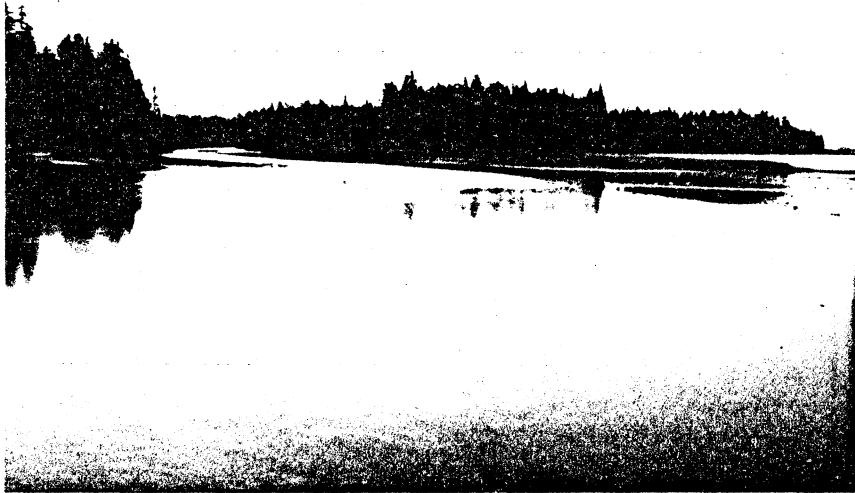
This fork is heavily beaver dammed for its surveyed length of 2,145 meters with approximately 750 meters of flowing stream between beaver dams. Primarily rearing habitat, heavy concentrations of coho fry were observed and trapped in this fork. A logging road with spurs is located 400 m from the stream with new units being cut in the watershed. The survey was terminated at a monolithic beaver dam (2.5m x 40m) at Section 14: 25m.







First West Lava Creek
106-30-088



1. Lower ITZ of 106-30-088.



2. Downstream view of lower ITZ extending toward Kashevarof Pass.

First West Lava Creek
106-30-088



3. Middle ITZ with grass meadow to right.



4. Downstream view of ITZ from mouth of stream.

First West Lava Creek
106-30-088

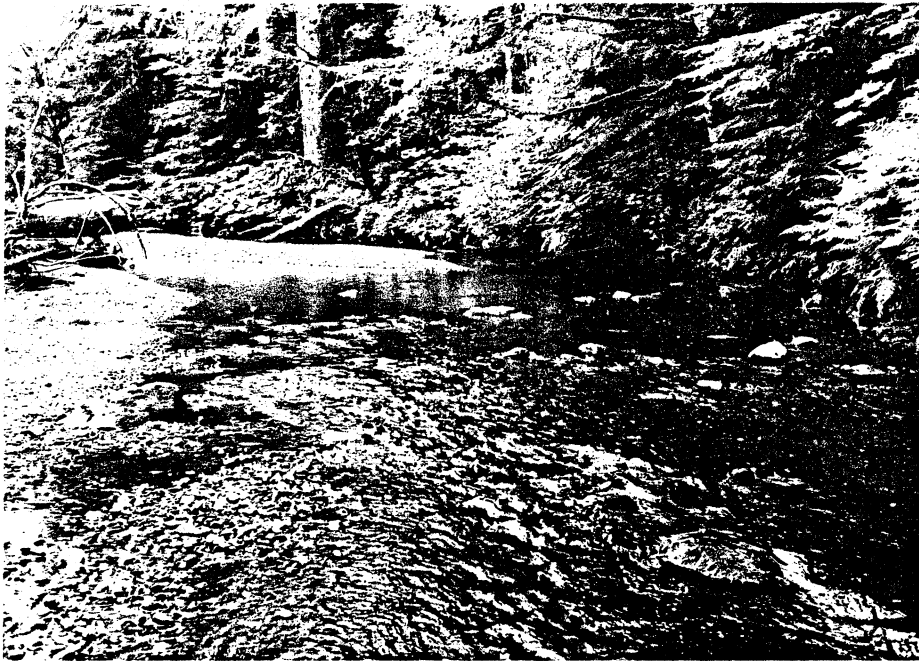


5. An abrupt substrate transition demarcates the ITZ/stream ecotone; i.e., mouth of stream.



6. Channel negotiates a notch via a bedrock/boulder channel.

First West Lava Creek
106-30-088

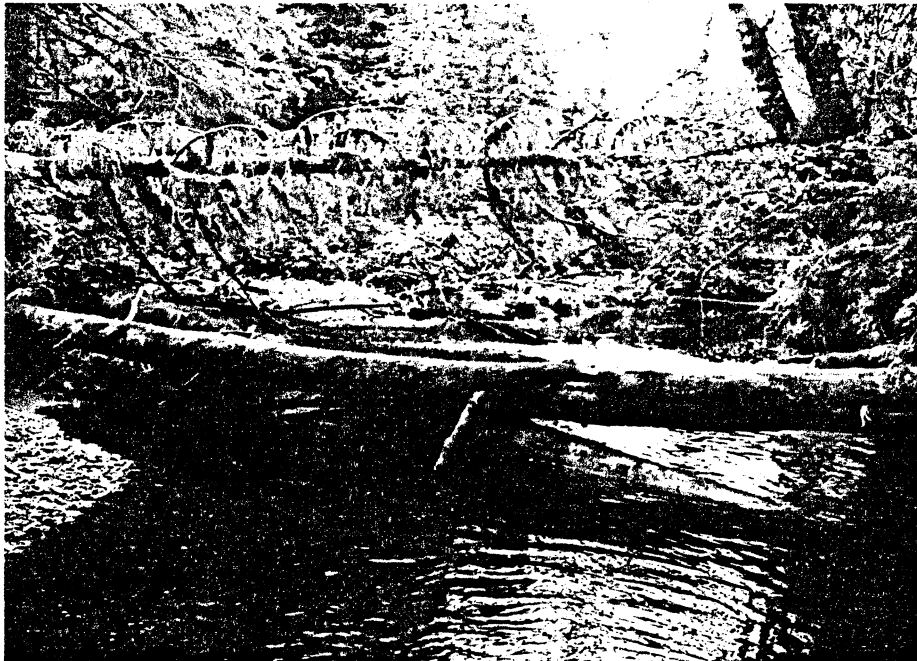


7. Above notch, channel broadens and spawning/rearing habitat becomes common.



8. Section 12: Braided channels, blowdown, bank undercutting, and accelerated bar formation characterize this extremely disturbed section.

First West Lava Creek
106-30-088



9. Section 13: The confluence of Survey Area "B" and the Main Stem.



10. Section 14: Riffle over small cobble and gravel. Good ASA and fair rearing habitat.

First West Lava Creek
106-30-088



11. Left Fork, Section 15: Upstream view taken from mainline logging road bridge crossing shows a clearcut unit to both banks and copious debris. 20+ adult PS were observed milling in foreground.



12. Stream leaves unit and enters mature forest cover.

First West Lava Creek
106-30-088

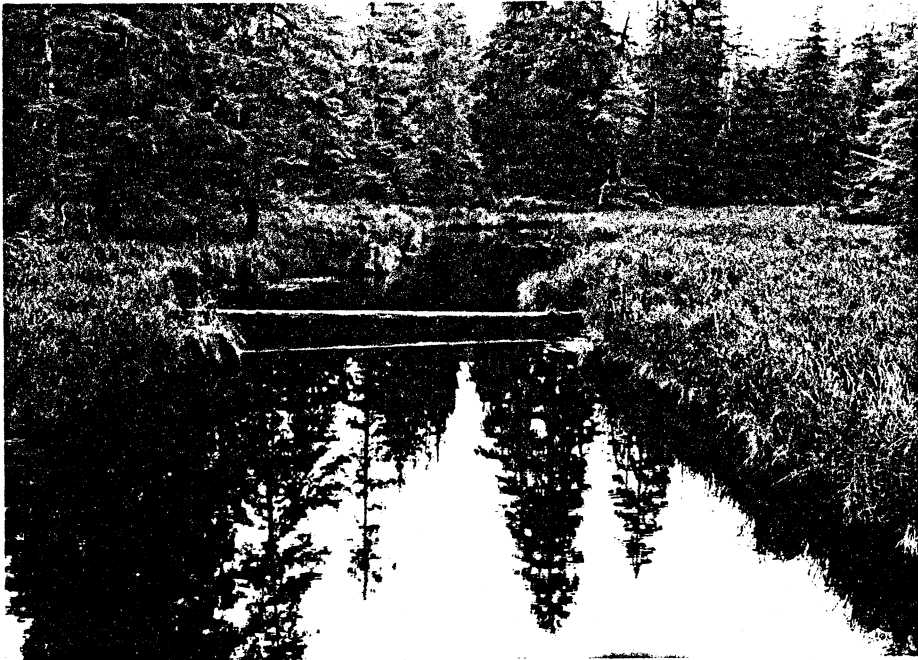


13. Stream flow over tilted bedrock in Reach V.



14. Survey Area "B", Section 1: Deep, slow water provides good rearing habitat just above the forks.

First West Lava Creek
106-30-088



15. Right Fork: Beaver impounded slough-like channel provides excellent rearing habitat; however, no ASA was observed. Dark water hindered observations.

First West Lava Creek
106-30-088

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
2	100	7.5	1	7.5	6	100	4.0	10	40.0
4	100	9.0	1	9.0	7	100	2.4	5	12.0
6	100	6.4	4	25.6	8	100	2.3	8	18.4
7	100	8.0	15	120.0	9	120	3.0	4	14.4
8	100	7.0	10	70.0	11	100	2.2	5	11.0
9	100	7.5	20	150.0	12	100	3.0	10	30.0
10	100	15.8	35	553.0	13	100	1.0	10	10.0
11	100	22.5	10	225.0	14	25	1.0	3	0.8
12	100	7.5	15	112.5	Total Area "B"				136.6m ²
13	100	9.0	10	90.0	Total Areas "A" & "B":				2342.8m ²
14	100	4.2	12	50.4					
15	100	7.0	8	56.0					
16	100	7.0	22	154.0					
17	100	6.2	11	68.2					
18	100	7.6	18	136.8					
19	100	5.0	13	65.0					
20	100	3.0	15	45.0					
21	100	6.0	15	90.0					
22	100	4.1	22	90.2					
23	100	8.0	11	88.0					
Total Area "A"				2206.2m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088
Survey Area "A"

Reach Number	1	1	1	1	1	1	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	184	197	208	187	203	209	213
4. Gradient	2.0	1.5	2.0	2.0	2.5	2.0	1.5
5. Water Quality	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6. Bank Type	2	2	2	2	2	2	2
7. Bank Stability	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	1	3	3	5	1	1	3
10. Undercut Bank Length	--	--	--	--	--	--	25
11. Stream Width:							
Channel	11	10	11	9	7	9	10
Water	9	7.5	10	9	7	6.4	8
12. Water Type %: SS	10	15	10	10	5	10	20
DS	--	--	5	--	--	10	5
SF	90	85	80	85	90	75	75
DF	--	--	5	5	5	5	--
13. Substrate %:							
Bedrock	70	60	35	34	75	40	2
Boulder	5	10	20	20	10	10	3
Large Cobble	10	15	20	20	7	20	5
Small Cobble	10	10	20	20	5	15	50
Gravel	5	5	5	5	3	11	40
Sand	--	--	--	1	--	4	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	1	--	1	--	4	15
15. Rearing Area %	5	10	10	5	2	10	10
16. Pool Cover %	5	5	10	10	5	10	5
17. Riffle Cover %	--	--	5	10	--	5	--
18. Fish Observed SS(fry)	<6	<12	<6	<6	1	<6	>6
DV(juv)		2		2		2	1
19. Sampling	N	Y	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: An abrupt transition in substrate occurs at IT/stream flow interface. Fines/small cobble yield to bedrock/boulder, resulting in a decrease in available habitat.

Section 2: Dense algal coverage of bedrock.

Section 3: Channel cutting through notch.

Section 4: Continuing through notch.

Section 5: Continuing through notch with bedrock side slopes, marginal rearing, and no ASA.

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LEVEL TWO HABITAT SURVEY
First West Lava Creek
106-30-088

Section 7: 57m; Channel broadens above notch, substrate changes and available habitat increases.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088
Survey Area "A"

Reach Number	2	2	2	2	2	2	
1. Section Number	8	9	10	11	12	13	
2. Section Length	100	100	100	100	100	100	
3. Compass Bearing	208	201	176	247	250	250	
4. Gradient	1.5	1.0	1.0	1.0	1.0	1.0	
5. Water Quality	1/1	1/1	1/1	1/1	1/1	1/1	
6. Bank Type	2	2	2	2	2	2	
7. Bank Stability	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	
9. Debris Loading	2	4	5	5	40	6	
10. Undercut Bank Length	23	15	30	3	--	--	
11. Stream Width:							
Channel	16	10.5	17.3	22.5	25	12.5	
Water	7	7.5	15.8	22.5	*	9	
12. Water Type %:							
SS	40	15	15	10	20	50	
DS	40	20	5	60	50	35	
SF	18	65	80	30	25	15	
DF	2	--	--	--	5	--	
13. Substrate %:							
Bedrock	--	--	--	--	--	--	
Boulder	1	1	--	--	--	--	
Large Cobble	4	3	--	--	--	5	
Small Cobble	40	30	35	30	30	35	
Gravel	50	50	55	60	60	50	
Sand	5	16	10	10	10	10	
Muck	--	--	--	--	--	--	
Other	--	--	--	--	--	--	
14. ASA %/Quality	10	20	35	10	15	10	
15. Rearing Area %	30	25	20	45	60	30	
16. Pool Cover %	5	15	15	15	60	15	
17. Riffle Cover %	--	--	--	--	--	--	
18. Fish Observed							
SS(fry)	<6	<12	>25	>25	>50	>6	
DV(juv)			>12			>6	
19. Sampling	Y	N	N	N	N	N	
20. Potential Barriers	N	N	N	N	N	N	
21. Enhancement/Rehab	N	N	N	N	N	N	

Section 8: Riffles provide good ASA and connect excellent rearing pools. However cover is conspicuously scarce.

Section 9: Good ASA and rearing habitat throughout; "fines" common.

Section 10: Same as Section 9.

Section 11: Lower boundary delineated by "non-barrier" debris jam formed at 90° bend in channel. Excellent rearing/holding section.

*L4.5R3.0

22. Investigators Ted Mickowski

Date 6/27/83

LEVEL TWO HABITAT SURVEY
First West Lava Creek
106-30-088

- Section 12: Lower boundary delineated by braided channels, bars, and the edge of an extensive patch of blowdown. Localized bank undercutting and "debris pool". Rearing SS fry prevalent.
- Section 13: Upper boundary delineated by junction of two forks.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088
"Left Fork" Survey Area "A"

Reach Number	3	3	3	3	3	3	3
1. Section Number	14	15	16	17	18	19	20
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	180	215	180	155	160	140	120
4. Gradient	1.5	2.0	2.0	2.0	2.0	2.0	2.0
5. Water Quality	3	3	1	1	1	1	1
6. Bank Type	A	A	A	A	A	A	A
7. Bank Stability	2(2)	2(2)	3(2)	3(2)	3(2)	3(1,2)	3(1,2)
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	8	10	8	16	18	16	11
10. Undercut Bank Length	33	50	38	33	40	53	40
11. Stream Width:							
Channel	5.6	12	13	16.5	14.7	13	16
Water	4.2	7	7	2.2/4	7.6	5	3
12. Water Type %: SS	30	30	30	30	40	30	30
DS	30	30	20	30	20	25	25
SF	40	40	50	40	40	45	45
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	--
Boulder	--	--	5	5	5	15	10
Large Cobble	15	20	25	25	25	30	35
Small Cobble	30	35	35	35	35	25	30
Gravel	40	30	25	25	25	20	20
Sand	15	15	10	10	10	10	5
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	12/3	8/3	22/3	11/3	18/3	13/3	15/3
15. Rearing Area %	35	40	35	45	45	40	50
16. Pool Cover %	15	20	20	20	20	20	20
17. Riffle Cover %	5	10	10	20	20	20	10
18. Fish Observed (fry)	SS	SS	SS	SS	SS	SS	SS
19. Sampling	N	Y	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab							

Section 14: 0m; Tributary (Survey Area "B") right bank; begin increased channel width with gravel riffles.

75m; Begin unit on both banks. Heavy concentration of debris and fines instream.

Section 15: 40m; Log stringer bridge crossing.

75m; Aquatic "slime" on substrate. Water temperature, 14°C. Excessive amounts of debris, limbs, root wads in stream. No buffer strip. Heavy concentration of coho fry.

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LEVEL TWO HABITAT SURVEY
First West Lava Creek
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- Section 16: 75m; Continued root wads and blowdown in stream with associated channel migration and braiding. Moderate amounts of coho fry.
- Section 17: 10m; Log debris jam. Moderate amounts of coho fry present.
- Section 18: Coho fry heavy throughout along with unstable banks.
90m; Debris jam resulting in braided channels and heavy sand deposition. Occasional streamside timber left standing, forming partial canopy.
- Section 19: Considerable braiding and channel migration coupled with bank instability. Increasing substrate size. Moderate amounts of coho fry present.
- Section 20: 100m; End braiding, leave unit.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088

"Left Fork"

Survey Area "A"

Reach Number	4	4	4	5	5	5	5
1. Section Number	21	22	23	24	25	26	27
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	74	139	159	94	54	159	159
4. Gradient	2	2	2	4	5	5	6
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B/A	B/A	B/A	B	B	B	B
7. Bank Stability	1(2)	1(2)	1(2)	1(2,3)	1(3)	1(3)	1(3)
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	4	6	9	2	--	3	6
10. Undercut Bank Length	15	35	65	--	--	--	--
11. Stream Width:							
Channel	12	11.3	26/16	9.2	6.0	8.8	8.0
Water	6	4.1	5/3	6.3	2.2	4.9	4.0
12. Water Type %: SS	30	30	30	10	15	15	15
DS	20	20	20	20	15	15	15
SF	50	50	50	50	40	40	40
DF	--	--	--	20	30	30	30
13. Substrate %:							
Bedrock	10	2	--	35	40	30	30
Boulder	20	18	15	30	30	35	35
Large Cobble	30	30	35	25	20	30	30
Small Cobble	30	30	30	10	10	5	5
Gravel	10	20	15	--	--	--	--
Sand	--	--	5	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	15/3	22/3	11/3	--	--	--	--
15. Rearing Area %	40	30	30	20	10	15	10
16. Pool Cover %	10	15	20	2	--	2	2
17. Riffle Cover %	3	5	10	5	2	5	2
18. Fish Observed (fry)	SS	SS	SS	--	SS	--	--
					DV		
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 21: Reach III; Banks stabilized. Enter old growth forest cover. Substrate becoming larger, left bank steepening.

Section 22: Logging unit along right bank, 30 meters distant. SS fry common. 50m; Instream island for 40 meters. Fringe blowdown, right bank.

Section 23: 40m; Log jam across mouth of left channel; moderate amounts of coho fry.

95m; Gradient and substrate size increasing.

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LEVEL TWO HABITAT SURVEY
First West Lava Creek
106-30-088

- Section 24: Reach IV; Channel is rapidly climbing via a predominantly bedrock/boulder "bed", providing marginal rearing and no ASA.
40m; Angular bedrock substrate begins.
60m; Bedrock cascades, 20 meters in length.
- Section 25: 40m; Channel enters V-notch.
- Section 27: 60m; Survey terminated due to lack of fish/habitat and channel gradients approaching 10%.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088
"Right Fork" Survey Area "B"

Reach Number	1	1	1	1	1	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	284	214	269	204	244	269	229
4. Gradient	<.5	<.5	<.5	<.5	<.5	.5	.5
5. Water Quality	4	4	4	4	4	4	4
6. Bank Type	A/B	A	A	A	A	A	A
7. Bank Stability	1(2)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	8	2	1	1	6	3	2
10. Undercut Bank Length	12	--	--	--	--	20	25
11. Stream Width:							
Channel	5	35	6	7	6	7.3	5.2
Water	5	35	6	7	6	4	2.4
12. Water Type %: SS	30	20	20	20	20	50	50
DS	60	80	80	80	80	30	35
SF	10	--	--	--	--	20	15
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	--
Boulder	--	--	--	--	--	--	--
Large Cobble	10	--	--	--	--	--	--
Small Cobble	5	--	--	--	--	10	20
Gravel	10	--	--	--	--	60	50
Sand	25	--	--	--	--	30	20
Muck	50	100	100	100	100	--	10
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	--	--	--	--	10/2	5/2
15. Rearing Area %	90	100	100	100	100	60	60
16. Pool Cover %	15	10	10	10	10	20	15
17. Riffle Cover %	--	--	--	--	--	2	2
18. Fish Observed (fry)	SS	--	--	--	--	SS	--
19. Sampling	N	N	N	N	N	Y	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Wide, dark brown channel with slow moving water and copious overhanging vegetation characterize this beaver modified fork. 85m; Beaver dam, 1.5 x 50 meters. Heavy concentration of coho fry.

Section 2: 50m; Logging road via log stringer bridge crosses channel.

Section 3 & 4: Impoundment.

Section 5: 10m; Blown out old beaver dam.

50m; Resume stream flow.

Section 7: Grassy overhanging banks typical.

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LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name First West Lava Creek 2. ADF&G Catalog No. 106-30-088

"Right Fork"

Survey Area "B"

Reach Number	2	2	3	4	4	4	4
1. Section Number	8	9	10	11	12	13	14
2. Section Length	100	120	950	100	100	100	25
3. Compass Bearing	219	229	264	229	249	244	269
4. Gradient	.5	.5	<.5	1	1	1.5	1.5
5. Water Quality	4	4	4	4	4	4	4
6. Bank Type	A	A	A	C	C	C/B	C
7. Bank Stability	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	8	4	15	2	2	5	12
10. Undercut Bank Length	18	13	--	25	43	33	5
11. Stream Width:							
Channel	5.4	8.1	60	3.8	3	2	2.2
Water	2.3	3.0	60	2.2	3	1	1
12. Water Type %: SS	50	40	30	40	35	35	35
DS	35	40	70	30	20	20	20
SF	15	20	--	30	45	45	45
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	--
Boulder	--	--	--	--	--	--	--
Large Cobble	--	--	--	5	5	10	5
Small Cobble	20	20	--	20	20	25	15
Gravel	50	50	--	60	70	60	70
Sand	20	20	--	15	5	5	10
Muck	10	10	100	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	8/2	4/2	--	5/2	10/2	10/2	3/2
15. Rearing Area %	60	70	100	50	40	40	40
16. Pool Cover %	20	10	15	5	5	5	5
17. Riffle Cover %	5	2	--	5	3	3	5
18. Fish Observed (fry)	SS	--	SS	SS	SS	--	SS
					DV		
19. Sampling	N	N	N	N	Y	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 8: Grassy overhanging banks.

Section 9: 120m; Culminates in 2 x 60 meter beaver dam in good repair.

Section 10: Impoundment

250m; Beaver dam, .75 x 60 meters.

500m; Resume flow for 75 meters over gravel/debris. Few SS observed.

575m; Beaver dam, 1 x 30 meters.

950m; Resume flow. Moderate densities of SS fry observed.

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LEVEL TWO HABITAT SURVEY
First West Lava Creek
106-30-088

- Section 11: Reach IV; Edge of muskeg, both banks, instream forbs and moderate rearing and spawning habitat.
- Section 12: Moderate amounts of SS/DV fry observed.
- Section 13: 75m; Leave edge of muskeg.
- Section 14: 25m; 2.5 meter high beaver dam in good repair. Survey terminated due to low flows and "small stream" character of channel, primarily impounded muskeg drainage.

FISH SAMPLING FORM

Stream Name First West Lava Cr ADF&G Catalog No. 106-30-088 Date 6/27/83

Identify Survey Area A & B Water Temp. 12.5°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1100	1400	--	Survey Area "A"	Section 2
2	1200	1345	--		Section 8
3	1425	1635	SS - 10 DV - 1		Section 15: 75m
4	1510	1613	SS - 1		Section 21: 10m
5	1130	1350	SS - 16 DV - 1	Survey Area "B"	Section 6: 0m

This form is used to record fish caught during Level Three, Four, or Five Surveys.

First West Lava Creek
106-30-088

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LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length --
 3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name West Lava IT Creek 2. ADF&G Catalog No. --
 3. Latitude 56°14'50" Longitude 133°07'32"
 4. Agency Unit 05 5. Mgmt. Area 535K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 23 Photo 16
 8. Bay/Drainage Kashevarof Pass 9. Access 1
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 3 cfs 14. Flow Stage 2
 15. Stream Temperature 13° 16. pH 7.5 17. Beaver Yes
 18. Temperature Sensitivity Yes; beaver/muskeg
 19. Barrier no 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 30 % Gravel/S. Cob. 40 %
 L. Cob/Boulder/Bedrock 50 %
 B. Gradient 1.5 %
 C. ASA % fair
 D. Schooling no
 E. Shellfish no
 F. Anchorage In bay only; extensive tide flat.

22. Comments

Stream Evaluation

This is a small stream that enters the middle ITZ of First West Lava Creek (106-30-088). Good rearing habitat is found for 250 meters within a grass meadow where coho and trout fry were observed. The stream then enters mature forest cover, bearing 180° at 1.5% gradient, with a water width of 1.2 meters. Some poor quality ASA is found in this muskeg drain which has a headwater beaver system.

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West Lava IT Creek



1. ITZ in grass meadow from confluence with 106-30-088.



2. Downstream view of ITZ and confluence with 106-30-088.

West Lava IT Creek



3. Mouth of stream leaving grass meadow and entering old forest cover.



4. Representative habitat; low velocity and gradients with forbs in stream.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
 3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Lava Creek 2. ADF&G Catalog No. 106-30-087
 3. Latitude 56°09'15" Longitude 133°06'25"
 4. Agency Unit 05 5. Mgmt. Area 535K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 24 Photo 7
 8. Bay/Drainage Kashevarof Pass 9. Access 1
 10. Present Land Use Active Logging and Road Use.
 11. Historical Land Use Selective Logging Adjacent to ITZ.
 12. Stream Origin 3, 4, 5, 6, 7 13. Estimated Flow about 10 cfs 14. Flow Stage 2
 15. Stream Temperature 8.5°C 16. pH 8.0 17. Beaver No
 18. Temperature Sensitivity No
 19. Barrier Yes; Section 9: 100m 20. Weather 1, 3

Part III.

21. Intertidal

- A. Substrate: Fines 20 % Gravel/S. Cob. 50%
 L. Cob/Boulder/Bedrock 30 %
 B. Gradient 1 %
 C. ASA % moderate
 D. Schooling Yes, in middle ITZ.
 E. Shellfish Common.
 F. Anchorage Skiff only; large mud flat (600m)

22. Comments

Intertidal Zone

The lower ITZ is a large mud flat with a moderate amount of clams, and a low tide schooling area. The middle portion of the ITZ runs through a grass meadow in which a small stream enters from the left bank (see Lava Intertidal Creek). The upper ITZ has a boulder/large cobble substrate with rearing pools where coho and DV trout fry were observed.

Stream Analysis

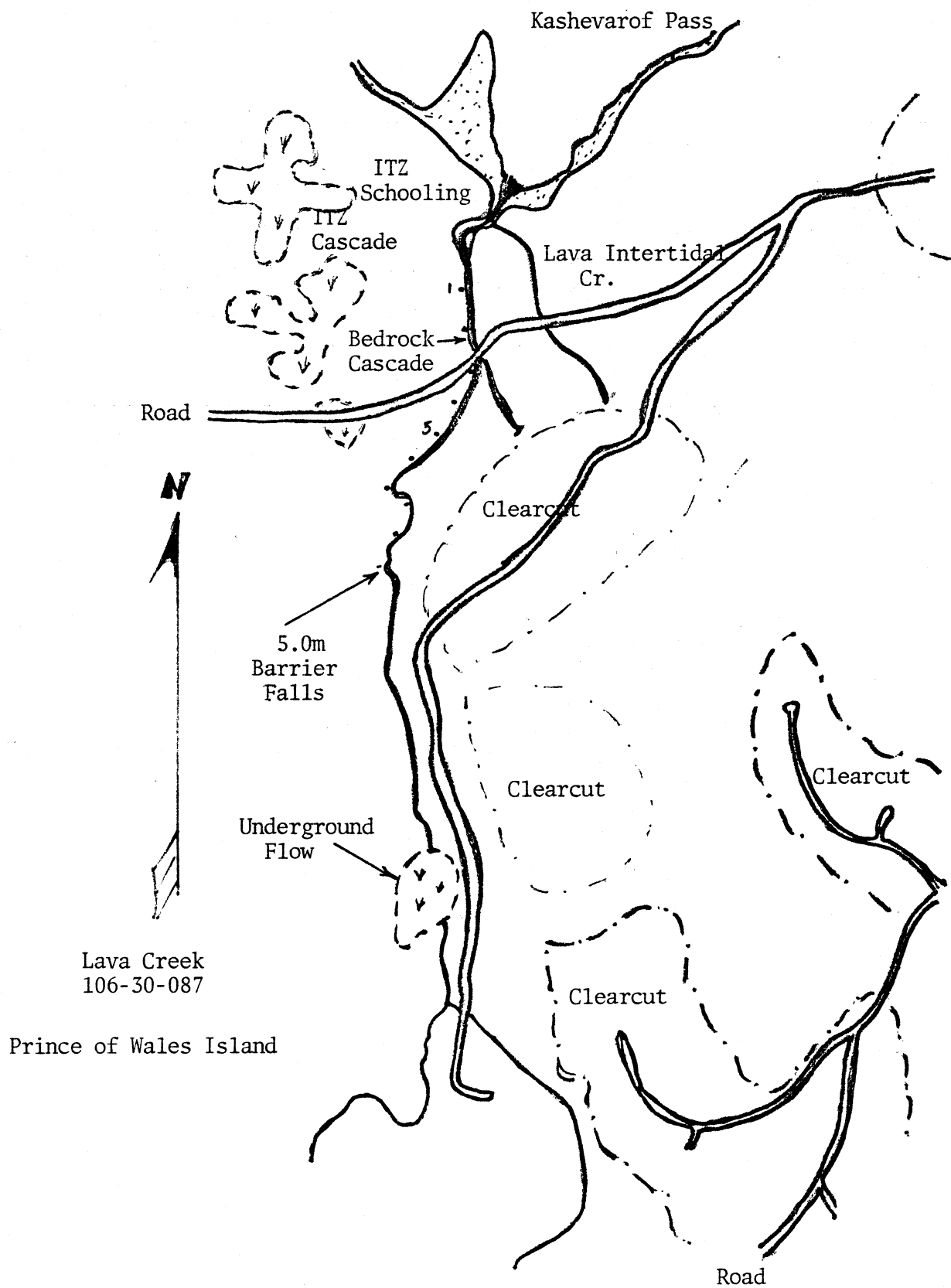
This is a low productivity stream with only DV trout fry observed in light concentrations. Coho fry were only observed in the ITZ. The substrate is predominantly bedrock, boulder and large cobble often with heavy moss growth. ASA is only found in small patches; rearing habitat is minimal. An active logging road crosses the stream at Section 2: 75m. A recent unit is located above and left of

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Lava Creek
106-30-087

Stream Analysis Cont.

the barrier falls found at Section 9: 100m. The survey was terminated after a reconnaissance above the barrier falls which found no habitat suitable for enhancement. Examination of aerial photographs indicates that at 400 meters above the barrier falls, the stream goes underground for about 400 meters before resurfacing which would explain the midsummer water temperature of 8.5°C (12°C would be "normal" at that time period).



Lava Creek
106-30-087



1. Lower ITZ with extensive tide flat.



2. Upper ITZ with grass meadow as viewed from schooling area.

Lava Creek
106-30-087



3. Mouth of stream with bedrock cascade.



4. Representative habitat, Section 2: 0m;
Well-channelized high velocity flow over
bedrock/boulder/large cobble.

Lava Creek
106-30-087



5. Log stringer bridge crossing, Section 2: 75m.



6. 15 meter barrier falls, Section 6: 100m.

Lava Creek
106-30-087

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	4.1	0	0					
2	100	3.1	2	6.2					
3	100	1.8	4	7.2					
4	100	5.2	0	0					
5	100	2.2	0	0					
6	100	5.0	4	20					
7	100	5.0	0	0					
8	100	6.6	0	0					
9	100	3.0	0	0					
Total				33.4m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Lava Creek

2. ADF&G Catalog No. 106-30-087

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	155	180	160	245	220	220	155
4. Gradient	3.5	4	3.5	3.5	5	3.5	4
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	B/C	B/C
7. Bank Stability	1(2)	1(2,3)	1(2,3)	1(2)	1(2,3)	1(2)	1(2,3)
8. Bank Vegetation	1-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	2	6	3	1	2	2	4
10. Undercut Bank Length	45	50	65	30	--	35	30
11. Stream Width:							
Channel	4.4	4.0	5.1	5.2	2.9	5.2	5.0
Water	4.1	3.1	1.8	5.2	2.2	5.0	5.0
12. Water Type %:							
SS	20	20	25	20	20	20	20
DS	75	15	20	20	10	20	20
SF	65	65	55	50	70	60	50
DF	--	--	--	10	--	--	--
13. Substrate %:							
Bedrock	20	20	10	15	20	5	35
Boulder	30	30	30	40	40	30	30
Large Cobble	20	20	30	20	20	35	10
Small Cobble	15	15	15	10	10	15	5
Gravel	10	10	10	10	10	10	5
Sand	5	5	5	5	--	5	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	2/3	4/3	--	--	4/3	--
15. Rearing Area %	20	20	30	20	15	35	25
16. Pool Cover %	30	35	5	5	2	5	5
17. Riffle Cover %	2	5	7	2	2	10	5
18. Fish Observed (fry)	DV	DV	--	--	--	--	--
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: 0m; Intertidal falls over moss covered bedrock. Continued 4% gradient over bedrock/boulder cobble.

75m; Large cobble substrate.

Section 2: 70m; Bedrock cascade for 20 meters.

75m; Log stringer bridge crossing.

85m; Debris jam.

Section 3: 50m; Tributary left side. No habitat.

70m; Muskeg 30 meters from right bank.

22. Investigators Gerry Merrigan Date 6/26/83

LEVEL TWO HABITAT SURVEY
Lava Creek
106-30-087

Section 4: 50m; Begin boulder/moss covered bedrock substrate.

Section 5: Series of cascades over boulder/bedrock.

Section 6: 40m; Debris jam.
60m; Edge of muskeg, right side.

Section 7: 50m; Leave muskeg as right bank steepens.
100m; Bedrock cascade.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Lava Creek 2. ADF&G Catalog No. 106-30-087

Reach Number	1	1					
1. Section Number	8	9					
2. Section Length	100	100					
3. Compass Bearing	130	210					
4. Gradient	5	6					
5. Water Quality	1	1					
6. Bank Type	B	B					
7. Bank Stability	1(2,3)	1(2,3)					
8. Bank Vegetation	1,3-5	1,3-5					
9. Debris Loading	2	4					
10. Undercut Bank Length	--	--					
11. Stream Width:							
Channel	7.5	6.3					
Water	6.6	3.0					
12. Water Type %: SS	20	20					
DS	--	--					
SF	80	70					
DF	--	10					
13. Substrate %:							
Bedrock	20	20					
Boulder	35	35					
Large Cobble	30	30					
Small Cobble	10	10					
Gravel	5	5					
Sand	--	--					
Muck	--	--					
Other	--	--					
14. ASA %/Quality	--	--					
15. Rearing Area %	10	5					
16. Pool Cover %	2	10					
17. Riffle Cover %	5	5					
18. Fish Observed (fry)	DV(1)	--					
19. Sampling	N	N					
20. Potential Barriers	N	Y2					
21. Enhancement/Rehab	N	N					

Section 8: Steep gradient over boulder/large cobble.

Section 9: 100m; 15.0 meter falls. Unit on left side (1 year old).

22. Investigators Gerry Merrigan Date 6/26/83

FISH SAMPLING FORM

Stream Name Lava Creek ADF&G Catalog No. 106-30-087 Date 6/26/83

Identify Survey Area A Water Temp. 8.5°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1150	1320	CO - 1		Section 1: 75m; Right bank.

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length --
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Lava IT Creek 2. ADF&G Catalog No. --
3. Latitude 56°09'15" Longitude 133°06'25"
4. Agency Unit 05 5. Mgmt. Area 535K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 24 Photo 7
8. Bay/Drainage Kashevarof Pass 9. Access 2
10. Present Land Use none
11. Historical Land Use Selective Logging
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 2 cfs 14. Flow Stage 2
15. Stream Temperature 10.0 16. pH 8.0 17. Beaver No
18. Temperature Sensitivity No
19. Barrier No 20. Weather

Part III.

21. Intertidal

- A. Substrate: Fines 15 % Gravel/S. Cob. 55 %
L. Cob/Boulder/Bedrock 30 %
B. Gradient 4 %
C. ASA % Fair
D. Schooling No; in ITZ of Lava Creek
E. Shellfish No
F. Anchorage No, large tide flat

22. Comments

Stream Evaluation

This small rearing stream enters the grass meadow intertidal area of Lava Creek (106-30-087), left side. This stream has rearing pools in the first 25 meters where coho fry and DV trout fry were observed. After 25 meters, the stream enters forest cover and gains the characteristics of a muskeg drainage: low gradient, low velocity, light tan water, forbs in stream, and so on.

23. Investigators Gerry Merrigan 24. Date 6/26/83

Lava Intertidal Creek



1. Mouth of stream with rearing ponds in meadows.
Shares left side IT meadow with 106-30-087.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas n/a 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Fire Island 1 2. ADF&G Catalog No. n/a
 3. Latitude 56°14'01" Longitude 133°04'25"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. _____
 8. Bay/Drainage Kashevarof Passage 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.5 14. Flow Stage _____
 15. Stream Temperature 7.0 16. pH 8.5 17. Beaver No
 18. Temperature Sensitivity no
 19. Barrier yes; 4.0m bedrock falls 20. Weather 1

Part III.

21. Intertidal

- A. Substrate: Fines -- % Gravel/S. Cob. 15 %
 L. Cob/Boulder/Bedrock 85 %
 B. Gradient 5 %
 C. ASA % 0
 D. Schooling Kashevarof Passage
 E. Shellfish none observed
 F. Anchorage Kashevarof Passage

22. Comments

Stream Evaluation

This small, steep stream climbs a bedrock V-notch providing no fisheries habitat and enters the ITZ by pummeling over a 4.0 meter high vertical bedrock face. No fish were observed and no rehabilitation or enhancement recommended.

23. Investigators Ted Mickowski 24. Date 6/26/83

Fire Island 1



1. View down boulder strewn ITZ across Kashevarof Passage to Fire Island.



2. Boulder strewn upper ITZ ends at the base of a 4.0 meter high bedrock falls. No fish or habitat were observed.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas n/a 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Fire Island 2 2. ADF&G Catalog No. n/a
 3. Latitude 56°13'45" Longitude 133°04'20"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. _____
 8. Bay/Drainage Kashevarof Passage 9. Access 1
 10. Present Land Use none
 11. Historical Land Use recently harvested unit borders left bank
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.5 cfs 14. Flow Stage 2
 15. Stream Temperature 7.0 16. pH 8.0 17. Beaver N
 18. Temperature Sensitivity no
 19. Barrier yes; low flow bedrock cascades 20. Weather 1

Part III.

21. Intertidal

- A. Substrate: Fines -- % Gravel/S. Cob. 15 %
 L. Cob/Boulder/Bedrock 85 %
 B. Gradient 6 %
 C. ASA % -
 D. Schooling Kashevarof Passage
 E. Shellfish none observed
 F. Anchorage Kashevarof Passage

22. Comments

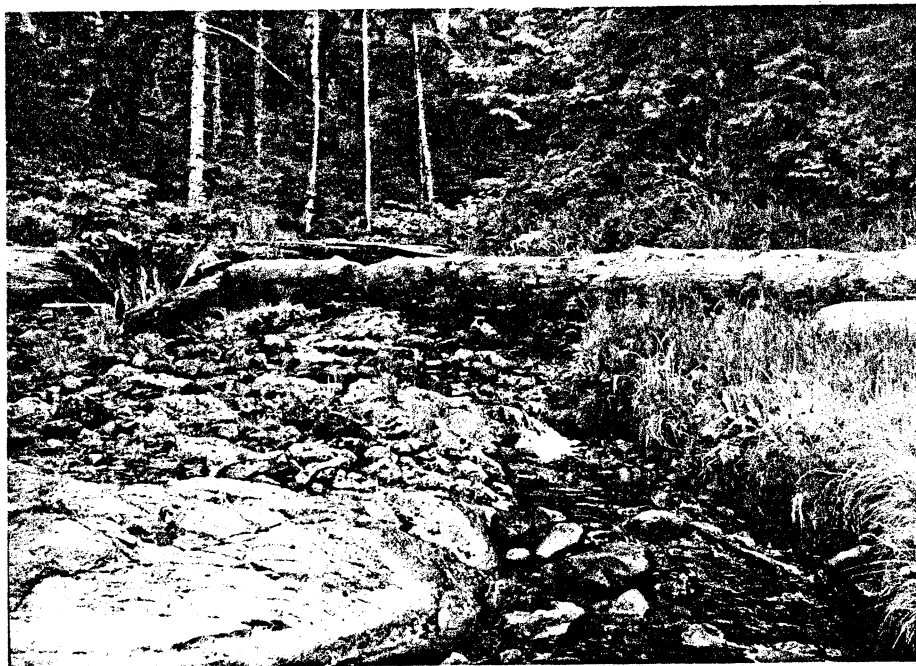
Stream Evaluation

This small, sinuous stream provides marginal resident spawning and moderate rearing habitat and is characterized by undercut banks, left bank buffer strip blowdown approaching 100%, bedrock outcrops, and dense overhanging shrubs.

Several juvenile DV were observed rearing in "fines" filled pools within 50 m of the ITZ. Adjacent to the blowdown zone, approximately 100 m above the ITZ, the channel climbs bedrock cascades which effectively block migration during periods of low flow. No fish or habitat were observed above this "barrier" and no rehabilitation or enhancement is recommended.

23. Investigators Ted Mickowski 24. Date 6/26/83

Fire Island #2



1. A clearcut unit borders this small, coarse channel just above the ITZ. Several juvenile DV and marginal habitat was noted.



2. View down boulder strewn lower ITZ, across Kashevarof Passage to Scrubby Island.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
 3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name West Exchange Cove #1 2. ADF&G Catalog No. --
 3. Latitude 56°11'45" Longitude 133°04'35"
 4. Agency Unit 05 5. Mgmt. Area 539K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 25 Photo 104
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use Actively used logging road.
 11. Historical Land Use none
 12. Stream Origin 3, 5, 6 13. Estimated Flow about 3 cfs 14. Flow Stage 2
 15. Stream Temperature 8.5 16. pH 8.0 17. Beaver no
 18. Temperature Sensitivity No
 19. Barrier No 20. Weather 1

Part III.

21. Intertidal

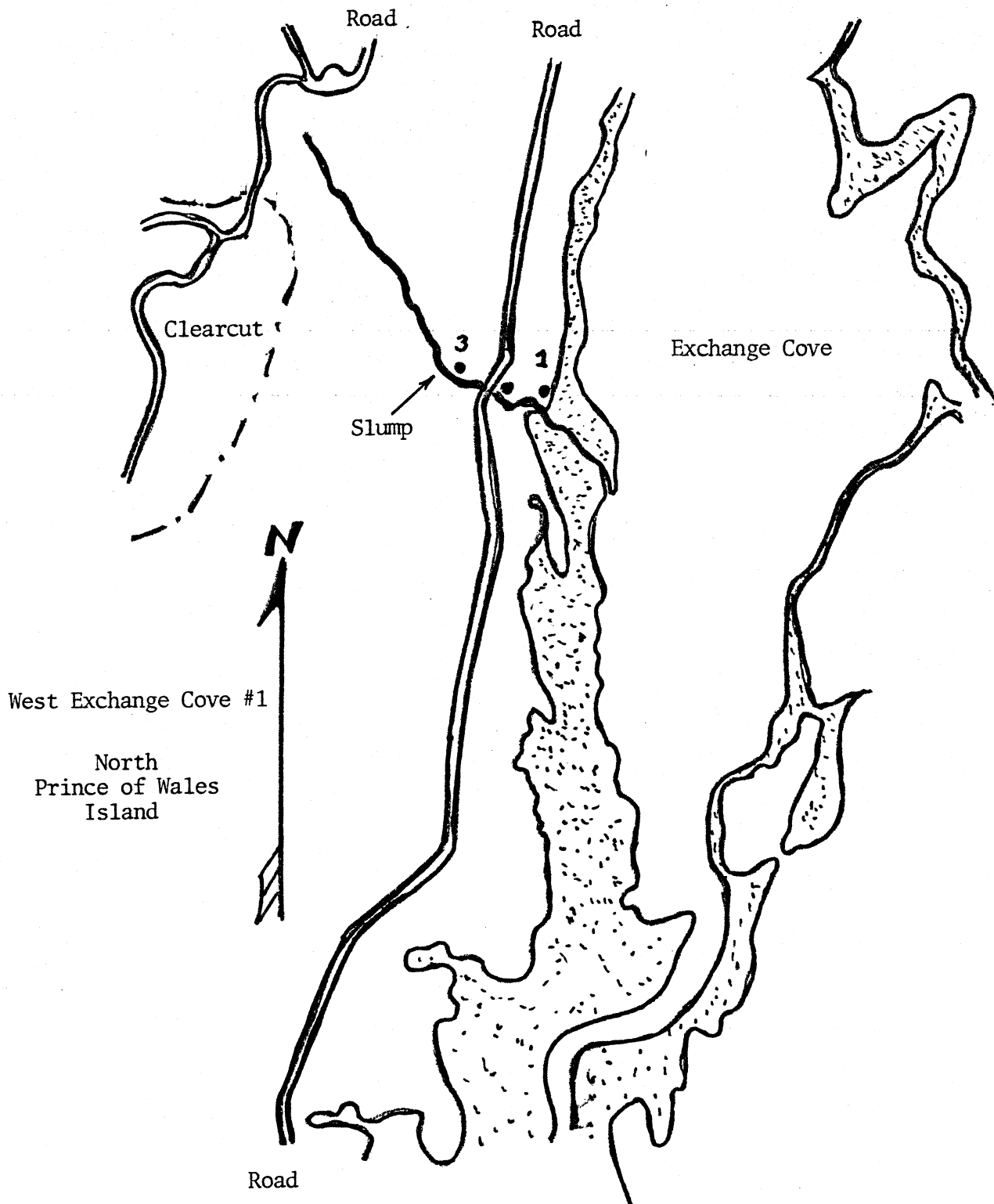
- A. Substrate: Fines 20 % Gravel/S. Cob. 30 %
 L. Cob/Boulder/Bedrock 50 %
 B. Gradient 3 %
 C. ASA % 0
 D. Schooling No, in cove only
 E. Shellfish None observed.
 F. Anchorage Exchange Cove

22. Comments

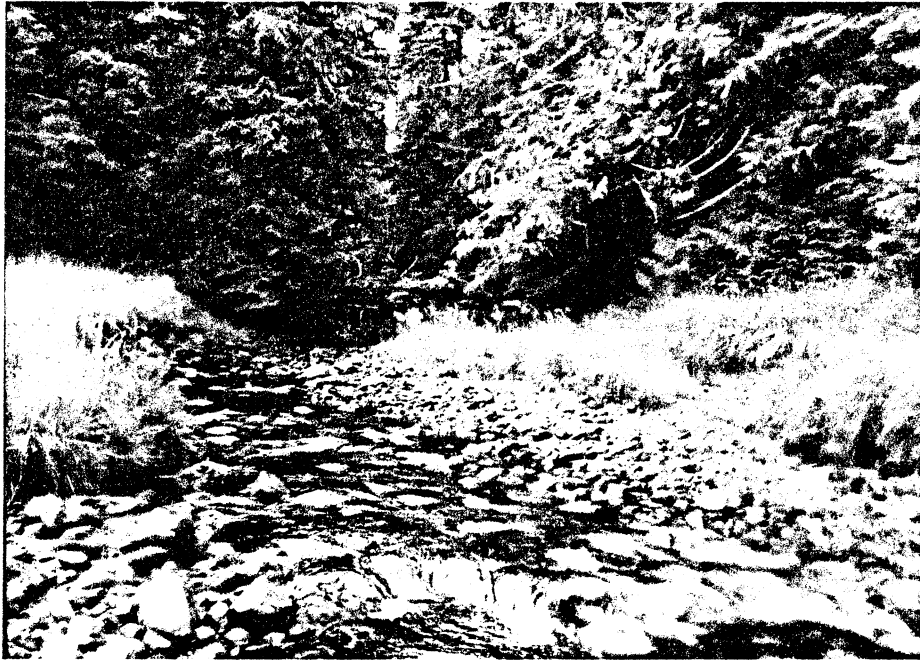
Stream Evaluation

This is a steep, fast mountainside stream with very little potential spawning and rearing area. Possibly, this stream could be used as a rearing area for coho fry in the first 100 meters, but none were observed at the time of the survey. The prevailing substrate is boulder/cobble. A road crossing via a culvert occurs at Section 1: 100 meters, which at high discharge levels, causes some downstream bank instability. Survey was terminated as stream heads up slope at rapidly increasing gradient.

23. Investigators Gerry Merrigan 24. Date 6/26/83



West Exchange Cove #1



1. Upper ITZ and stream mouth with flow over boulder/cobble.



2. Downstream view of ITZ at high tide looking toward Exchange Cove.

West Exchange Cove #1



3. Road crossing via 5' culvert, Section 1: 100m.

West Exchange Cove #1

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	2.2	10	22.0					
2	100	2.0	0	0					
3	100	2.4	0	0					
Total				22.0m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West Exchange Cove #1 2. ADF&G Catalog No. --

Reach Number							
1. Section Number	1	2	3				
2. Section Length	100	100	100				
3. Compass Bearing	265	320	330				
4. Gradient	4	4.5	5				
5. Water Quality	1	1	1				
6. Bank Type	B	B	B				
7. Bank Stability	2(2)	2(2)	2(2)				
8. Bank Vegetation	1-5	1-5	1-5				
9. Debris Loading	8	3	5				
10. Undercut Bank Length	60	30	20				
11. Stream Width:							
Channel	4.6	2.0	3.8				
Water	2.2	2.0	2.4				
12. Water Type %: SS	20	20	20				
DS	10	10	10				
SF	70	70	70				
DF	--	--	--				
13. Substrate %:							
Bedrock	--	--	--				
Boulder	35	40	40				
Large Cobble	30	30	30				
Small Cobble	20	20	20				
Gravel	10	10	10				
Sand	5	--	--				
Muck	--	--	--				
Other	--	--	--				
14. ASA %/Quality	10/1	--	--				
15. Rearing Area %	20	20	15				
16. Pool Cover %	10	5	5				
17. Riffle Cover %	5	5	5				
18. Fish Observed (fry)	DV-1	DV-2	DV-4				
19. Sampling	N	N	N				
20. Potential Barriers	N	N	N				
21. Enhancement/Rehab	N	N	N				

Section 1: 20m; Debris jam.
50m; Spawning gravel patch behind debris jam.
100m; Road crossing with 5' culvert. Bank instability left side below road. Culvert passable by fish.

Section 2: 100m; Increasing gradient and substrate size. Isolated bank instability.

Section 3: 30m; Slump left side; debris jam.
100m; Heads up V-notch up mountainside.

22. Investigators Gerry Merrigan Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas n/a 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove W. 2 2. ADF&G Catalog No. n/a
 3. Latitude 56°11'31" Longitude 133°04'41"
 4. Agency Unit 05 5. Mgmt. Area 539K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-25-105
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use logging road crosses stream 200 meters above ITZ
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.5 cfs 14. Flow Stage 2
 15. Stream Temperature 10°C 16. pH 7.8 17. Beaver no
 18. Temperature Sensitivity no
 19. Barrier no 20. Weather a 1

Part III.

21. Intertidal

- A. Substrate: Fines 60% Gravel/S. Cob. 20%
 L. Cob/Boulder/Bedrock 20%
 B. Gradient 2.5%
 C. ASA % --
 D. Schooling Exchange Cove and bight.
 E. Shellfish Moderate throughout cove.
 F. Anchorage Exchange Cove

22. Comments

Stream Evaluation

This small stream crosses a logging road via a log culvert approximately 200 m above the ITZ. Orange and white forest service flagging was observed on the banks along the road, indicating resident fish habitat. Downstream reconnaissance revealed no identifiable spawning habitat and marginal rearing habitat. Three juvenile DV were observed. Channel characteristics include a 1.5-3.0 meter wide boulder/large cobble bed, primarily fast flow, copious debris and dense overhanging shrubs. Upon exiting treeline an extensive ITZ of "fines" meanders through a salt marsh providing 10 m² of spawning area and limited rearing habitat. Approximately 20 SS fry were observed rearing in several pools adjacent to the lone deposit of intertidal spawning gravel. No rehabilitation or enhancement recommended.

23. Investigators Ted Mickowski 24. Date 6/26/83

Exchange Cove West #2



1. Upper intertidal zone; copious debris and dense overhanging shrubs typify reconnoitered area.



2. Sinuous intertidal slough contained one pocket of ASA and marginal rearing habitat.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 m
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name West Exchange Cove #3 2. ADF&G Catalog No. none
 3. Latitude 56°11'15" Longitude 133°04'55"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-219
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use road crossing
 11. Historical Land Use none
 12. Stream Origin 5 13. Estimated Flow 3 cfs 14. Flow Stage 2
 15. Stream Temperature 11.0°C 16. pH 8.5 17. Beaver none
 18. Temperature Sensitivity yes, small stream with southern exposure
 19. Barrier none surveyed 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 25 % Gravel/S. Cob. 75 %
 L. Cob/Boulder/Bedrock 0 %
 B. Gradient 2.0%
 C. ASA % 30/good
 D. Schooling no
 E. Shellfish yes
 F. Anchorage Exchange Cove

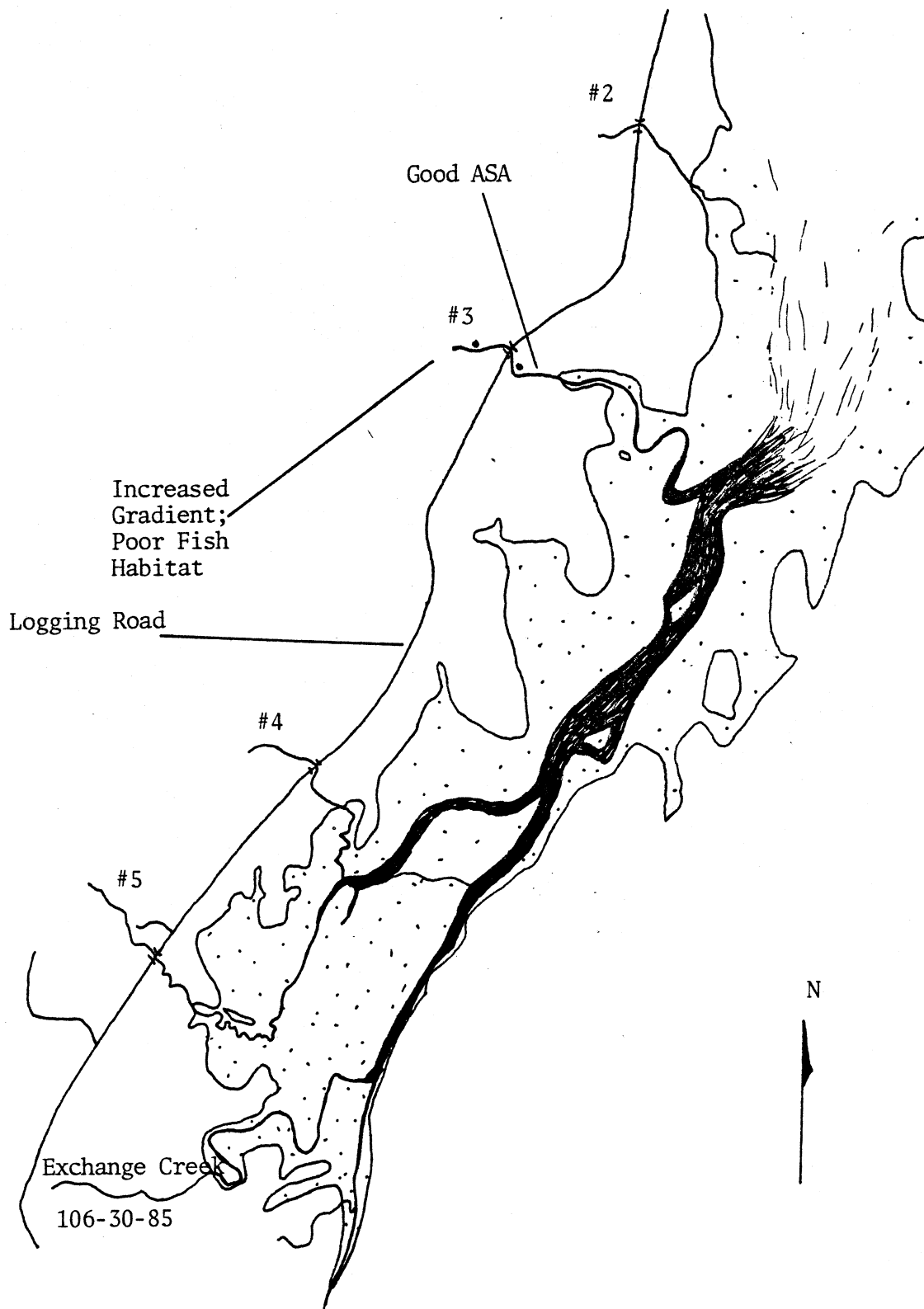
22. Comments

Stream Evaluation

This small stream provides excellent ASA. Debris, riparian vegetation and undercut banks produce cover for rearing coho and Dolly Varden. The ITZ flows into the ITZ of Exchange Creek at its northern extremity. Intertidal ASA is good, consisting predominantly of small cobble.

23. Investigators Randy Ericksen 24. Date 6/27/83

West Exchange Cove #3



West Exchange Cove #3



1. Looking upstream toward the creek mouth. The ITZ provides excellent ASA.



2. Section 1 contains excellent ASA and cover.

West Exchange Cove #3

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	2.2	30	66					
2	100	2.1	10	21					
Total				87.0m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West Exchange Cove #3 2. ADF&G Catalog No. n/a

Reach Number	1	1					
1. Section Number	1	2					
2. Section Length	100	100					
3. Compass Bearing	270	300					
4. Gradient	3.0	4.0					
5. Water Quality	1	1					
6. Bank Type	B	B					
7. Bank Stability	1/1	1/1					
8. Bank Vegetation	1-5	1,3,4					
9. Debris Loading	30	20					
10. Undercut Bank Length	20	10					
11. Stream Width:							
Channel	3.1	2.1					
Water	2.2	2.1					
12. Water Type %: SS	35	35					
DS	5	--					
SF	60	65					
DF	--	--					
13. Substrate %:							
Bedrock	--	--					
Boulder	10	20					
Large Cobble	20	20					
Small Cobble	35	30					
Gravel	30	25					
Sand	5	5					
Muck	--	--					
Other	--	--					
14. ASA %/Quality	30/3	10/2					
15. Rearing Area %	10	5					
16. Pool Cover %	30	5					
17. Riffle Cover %	40	5					
18. Fish Observed	SS	SS					
	DV	DV					
		CT					
19. Sampling	N	Y					
20. Potential Barriers	N	N					
21. Enhancement/Rehab	N	N					

Section 1: Begin at treeline. Coho fry present in ITZ and near the creek mouth
Heavy debris loading, good ASA.

Section 2: Road bridge at 55 m. Gradient increase at end of section. Habitat
quality deteriorating. Two markers are located just above the bridge.
They state "10-78 Fish Stream #6, shocked IDV" and "6/81 Stream #12
Culvert Survey".

22. Investigators Randy Ericksen Date 6/27/83

FISH SAMPLING FORM

Stream Name West Exchange ADF&G Catalog No. n/a Date 6/27/83
Cove #3
Identify Survey Area A Water Temp. 11.0°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1000	1035	SS - 1		Set above bridge in Section 2.

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 m
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name West Exchange Cove #4 2. ADF&G Catalog No. none
 3. Latitude 56°10'45" Longitude 133°05'25"
 4. Agency Unit 5 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-219
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use road crossing
 11. Historical Land Use none
 12. Stream Origin 5 13. Estimated Flow 4 cfs 14. Flow Stage 2
 15. Stream Temperature 10.5°C 16. pH 8.5 17. Beaver none
 18. Temperature Sensitivity yes; small stream, southern exposure
 19. Barrier none surveyed 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 30 % Gravel/S. Cob. 60 %
 L. Cob/Boulder/Bedrock 10 %
 B. Gradient 1.0 %
 C. ASA % 20/good
 D. Schooling no
 E. Shellfish no
 F. Anchorage Exchange Cove

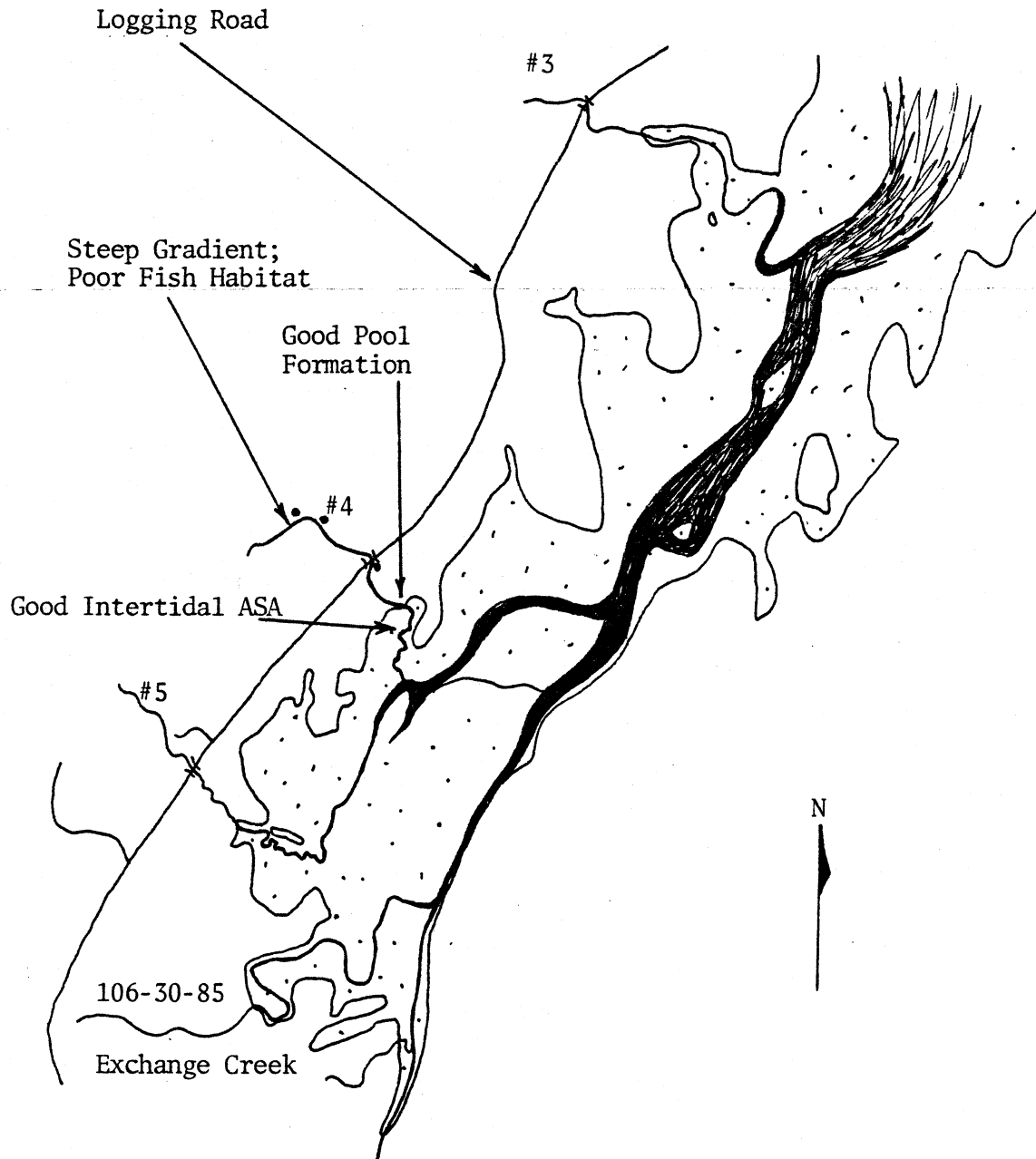
22. Comments

Stream Evaluation

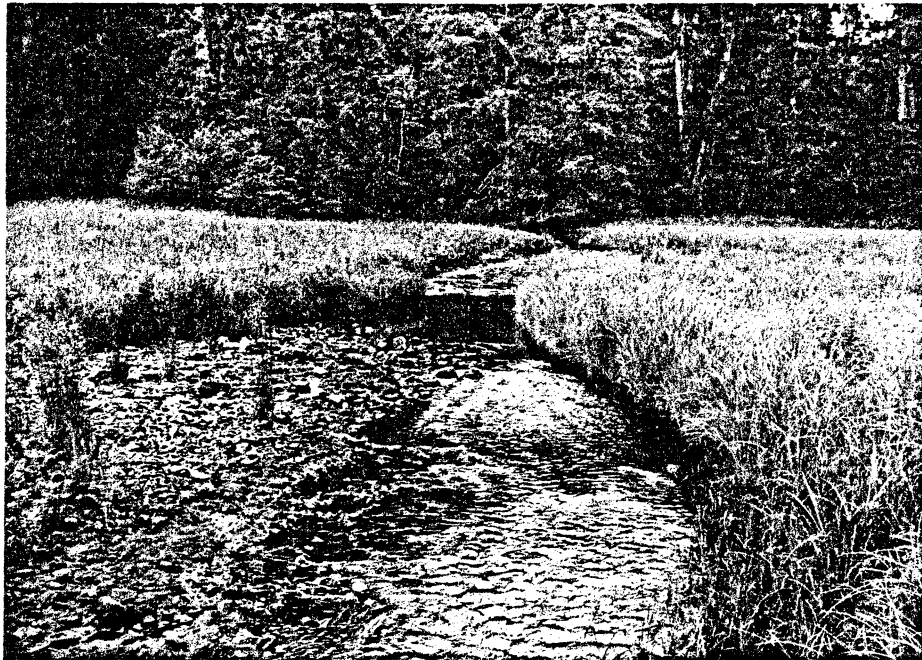
This stream shares the ITZ with West Exchange Cove #5 and subsequently with Exchange Creek. Intertidal ASA is good before it merges with the Exchange Cove #5 ITZ. Substrate consists largely of mixed cobble. The stream is susceptible to rapid flow fluctuations as evidenced by scoured banks. Coho fry were observed into Section 2.

23. Investigators Randy Ericksen 24. Date 6/27/83

West Exchange Creek #4



West Exchange Cove #4



1. The ITZ provides good ASA.



2. Cobble substrate in Section 1 creates fair ASA.

West Exchange Cove #4

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	3.0	5	15					
2	100	3.3	3	9.9					
3	50	2.6	2	2.6					
Total				27.5m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West Exchange Cove #4 2. ADF&G Catalog No. n/a

Reach Number	1	1	1				
1. Section Number	1	2	3				
2. Section Length	100	100	50				
3. Compass Bearing	350	300	270				
4. Gradient	2.0	3.0	4.5				
5. Water Quality	1	1	1				
6. Bank Type	B	B	B				
7. Bank Stability	1/1	1/1	1/1				
8. Bank Vegetation	1-5	1,3,4	1,3,4				
9. Debris Loading	10	5	5				
10. Undercut Bank Length	5	--	--				
11. Stream Width:							
Channel	4.2	4.0	3.1				
Water	3.0	3.3	2.6				
12. Water Type %: SS	40	30	20				
DS	10	5	--				
SF	50	60	80				
DF	--	--	--				
13. Substrate %:							
Bedrock	--	--	--				
Boulder	--	--	10				
Large Cobble	40	40	40				
Small Cobble	40	50	40				
Gravel	10	10	10				
Sand	10	--	--				
Muck	--	--	--				
Other	--	--	--				
14. ASA %/Quality	5/2	3/3	2/3				
15. Rearing Area %	10	5	2				
16. Pool Cover %	5	2	2				
17. Riffle Cover %	5	2	2				
18. Fish Observed	SS	SS					
	CT	CT	CT				
	DV	DV	DV				
19. Sampling	Y	N	N				
20. Potential Barriers	N	N	N				
21. Enhancement/Rehab	N	N	N				

Section 1: Begin at treeline. Good pool formation. Poor cover. Bridge at end of section. Coho fry common. Stream enters steep V-notch just below the bridge.

Section 3: Steep gradient. Poor fish habitat.

22. Investigators Randy Ericksen Date 6/27/83

FISH SAMPLING FORM

Stream Name West Exchange ADF&G Catalog No. n/a Date 6/27/83
Cove #4
 Identify Survey Area A Water Temp. 10.5 Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1125	1145	SS - 1		Section 1 just below bridge.

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 m
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name West Exchange Cove #5 2. ADF&G Catalog No. none
 3. Latitude 56°10'30" Longitude 133°05'45"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-219
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use road crossing, scheduled to be logged, unit 17-15
 11. Historical Land Use none
 12. Stream Origin yes 13. Estimated Flow 2 cfs 14. Flow Stage 2
 15. Stream Temperature 8.5°C 16. pH 8.5 17. Beaver none
 18. Temperature Sensitivity yes; small stream, southern exposure
 19. Barrier none surveyed 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 65 % Gravel/S. Cob. 35 %
 L. Cob/Boulder/Bedrock 0 %
 B. Gradient 0.5 %
 C. ASA % 2/good
 D. Schooling no
 E. Shellfish no
 F. Anchorage Exchange Cove

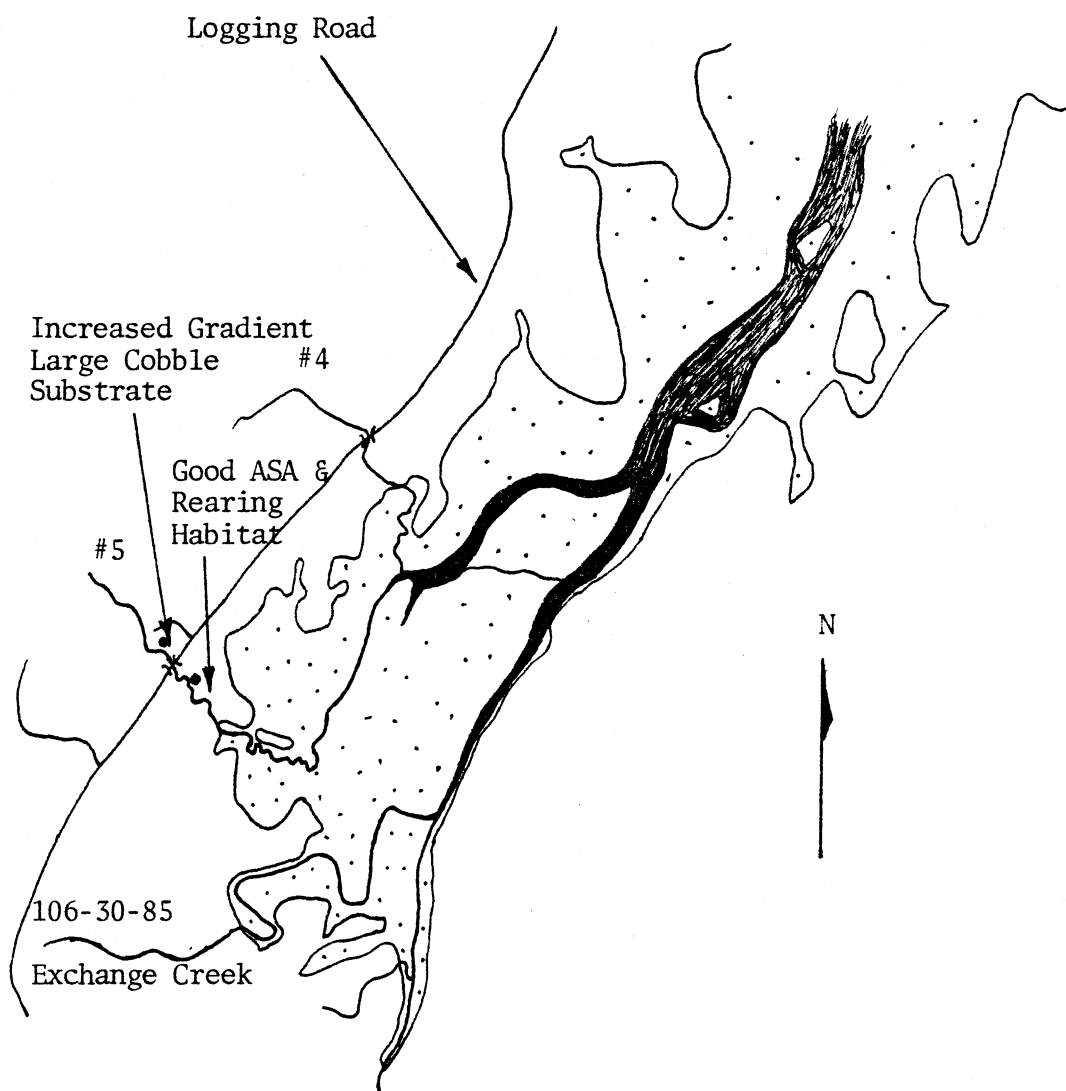
22. Comments

Stream Evaluation

The ITZ of this small stream merges with the ITZ of West Exchange Cove #4 and Exchange Creek. The exclusive ITZ for this stream cuts a sinuous channel through the grass flat. Intertidal ASA is limited by sandy substrate. Fish habitat is good near the mouth, but steadily deteriorates moving upstream. Two spur roads have been constructed on either side of the stream to access a future timber harvest. Substantial buffer strips should be left along both banks to protect this temperature sensitive stream.

23. Investigators Randy Ericksen 24. Date 6/27/83

West Exchange Cove #5



West Exchange Cove #5



1. The ITZ looking toward the creek mouth. Intertidal ASA is limited due to sandy substrate.



2. Section 1: Good ASA and rearing habitat.

West Exchange Cove #5

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	2.9	10	29					
2	100	2.1	3	6.3					
Total				35.3m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West Exchange Cove #5 2. ADF&G Catalog No. n/a

Reach Number	1	1					
1. Section Number	1	2					
2. Section Length	100	100					
3. Compass Bearing	320	330					
4. Gradient	2.0	4.0					
5. Water Quality	1	1					
6. Bank Type	B	B					
7. Bank Stability	1/1	1/1					
8. Bank Vegetation	1-5	1,3,4					
9. Debris Loading	5	5					
10. Undercut Bank Length	30	--					
11. Stream Width:							
Channel	3.4	3.0					
Water	2.9	2.1					
12. Water Type %: SS	40	30					
DS	--	--					
SF	60	70					
DF	--	--					
13. Substrate %:							
Bedrock	--	--					
Boulder	--	5					
Large Cobble	--	60					
Small Cobble	50	25					
Gravel	30	10					
Sand	20	--					
Muck	--	--					
Other	--	--					
14. ASA %/Quality	10/2	3/2					
15. Rearing Area %	30	5					
16. Pool Cover %	10	10					
17. Riffle Cover %	10	10					
18. Fish Observed	CT	CT					
	DV	DV					
	SS	SS					
19. Sampling	N	N					
20. Potential Barriers	N	N					
21. Enhancement/Rehab	N	N					

Section 1: Begin at treeline. Good ASA and rearing habitat. Coho fry common.
 Section 2: Increased gradient; decreased fish habitat quality. Bridge at 75 m.
 Marker above bridge states "7-79 Unit 17-15 Stream #1 SS & DV, ex. rearing".

22. Investigators Randy Ericksen Date 6/27/83

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A, B, C & D 2. Section Length variable
 3. Historical Fish Species PS and CS

Part II.

1. Stream Name Exchange Creek 2. ADF&G Catalog No. 106-30-85
 3. Latitude 56°10'15" Longitude 133°05'45"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 23 610050 679-24, 24 610050 579-218
 8. Bay/Drainage Exchange Cove 9. Access 1
 10. Present Land Use roaded, currently being logged along the drainage
 11. Historical Land Use none
 12. Stream Origin 1, 3, 4, 5 13. Estimated Flow 10 cfs 14. Flow Stage 2
 15. Stream Temperature 13°C 16. pH 7.5 17. Beaver yes
 18. Temperature Sensitivity no
 19. Barrier 2, Survey Area B 20. Weather 1, 3

Part III.

21. Intertidal - before survey begins
 A. Substrate: Fines 90 % Gravel/S. Cob. 8 %
 L. Cob/Boulder/Bedrock 2 %
 B. Gradient 0.5 %
 C. ASA % 0
 D. Schooling yes
 E. Shellfish yes
 F. Anchorage Exchange Cove

22. Comments

Stream Evaluation

Exchange Creek is the major freshwater source entering the Exchange Cove estuary. This rich estuary supports a variety of marine animals. Flounder, crab and clams were prolific at the outer extremities of the ITZ. Terrestrial animals, such as deer and black bear, were commonly seen browsing in the grassflats. Most of the IT portion of the stream provides very little salmonid habitat. Substrate is largely sand and muck with no cover. However, the survey of Exchange Creek begins 1020 m into the ITZ. This region of the ITZ contains significantly better salmonid habitats.

Survey Areas A & B were surveyed in June; Areas C & D were surveyed in September. By September PS had entered the system and were found in Survey Areas C & D. Exchange Creek is a known pink and chum salmon stream. Coho fry were found in all survey areas with the possible exception of Survey Area D. Fish habitat is variable throughout Exchange Creek but generally good.

23. Investigators Merrigan, Mickowski & Ericksen Date 6/26 & 9/27/83

LEVEL TWO HABITAT SURVEY Survey Area Analysis

Survey Area A: (pH - 7.5; H₂O - 13.0°C; flow - 10 cfs)

Beginning 1020 m into the ITZ, ASA is excellent but rearing habitat is poor due to lack of pools and cover. Windthrow along the initial non-tidal sections has altered the habitat significantly. Fallen logs have altered the stream flow, cutting new channels and eroding existing banks. ASA is plentiful but somewhat compacted by sediments. Rearing habitat is good. Moving upstream, gradient increases and substrate becomes large for a period and then levels out with progressively smaller substrate below for the lake. The region is very stable with negligible flow fluctuations. Logging activity was ongoing along this drainage during the time of survey. This survey area is the outlet for Exchange Lake, which had three inlet streams entering the west end: South headwater (Survey Area C), Middle headwater (a beaver system with no ASA), and North headwater (Survey Area D).

Survey Area B: (pH - 8.0; H₂O - 11.5°C; flow - 4.5 cfs)

This survey area enters the right bank at the end of Section 7; Survey Area A. This tributary becomes steep with large cobble/boulder substrate soon after the confluence with Survey Area A. Fish habitat deteriorates steadily until Section 5. At this point gradient becomes low/moderate with smaller substrate. ASA and rearing habitat are good until an abrupt gradient increase in Section 10. Blue clay deposits are common along the banks in Sections 7-10.

Survey Area C: (pH - 6.3; H₂O - 5.5°C; flow - 1.5 cfs)

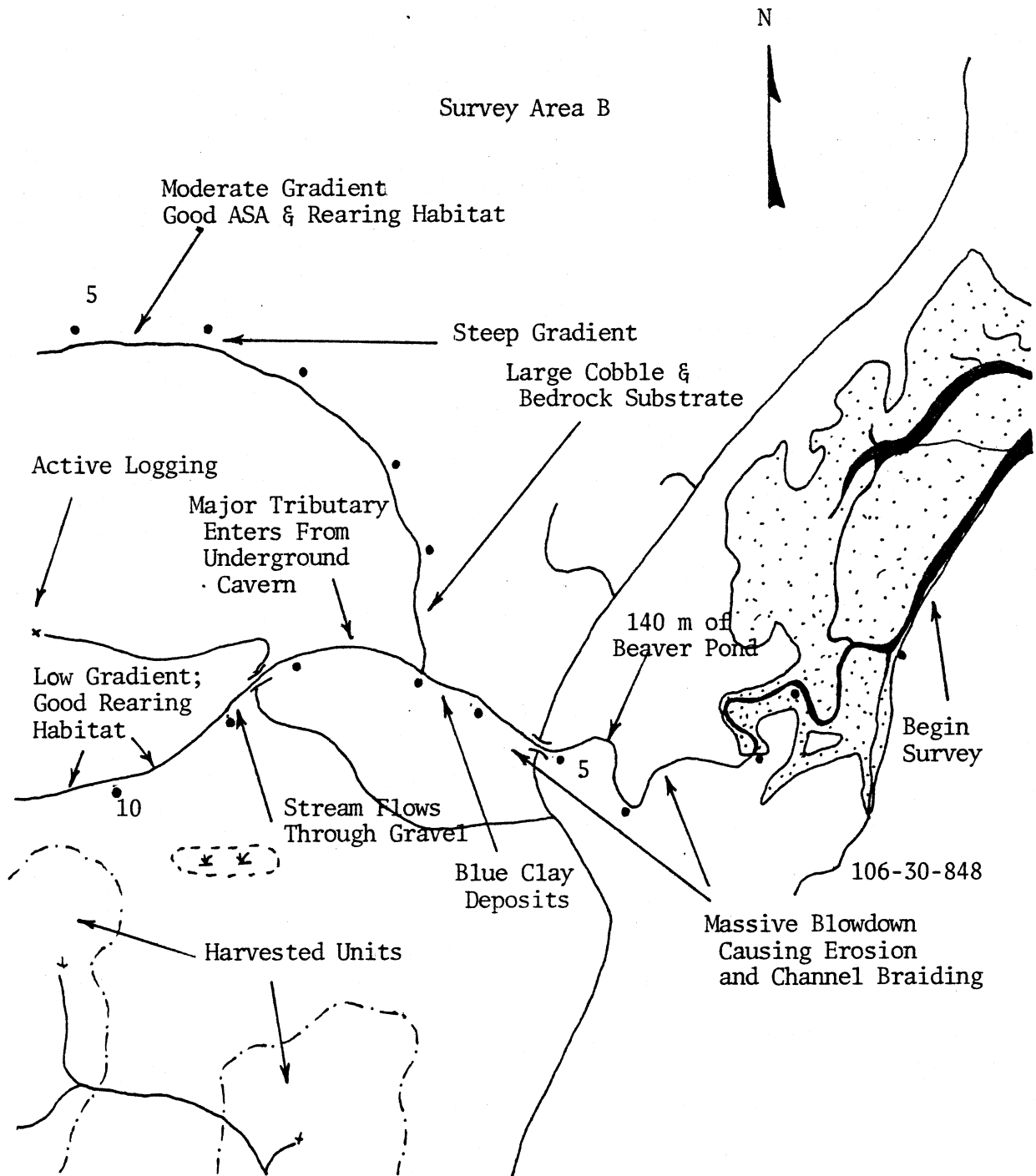
The Southwestern headwater drainage to Exchange Lake is a small, sinuous stream which meanders through sumpy lowlands, providing 300 meters of excellent spawning and rearing habitat. An abrupt change in habitat (i.e., Reach 2), characterized by reduced channel width, increased gradient, and coarse substrate negated additional surveying due to a paucity of habitat. Rearing silver salmon fry were observed throughout Reach 1. No rehabilitation or enhancement recommended.

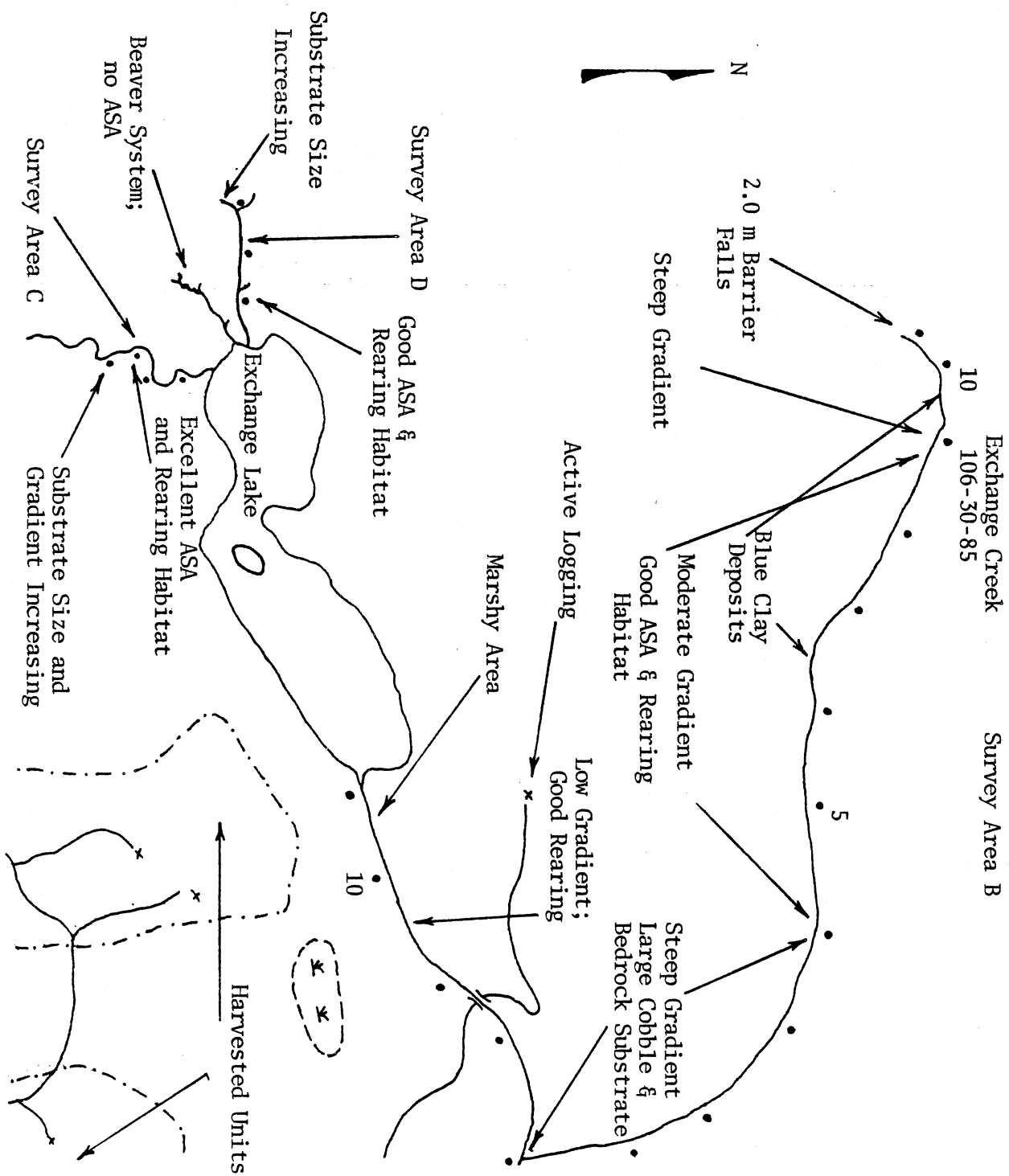
Survey Area D: (300 m; pH - 6.3; H₂O - 7°C; flow - about 4.0 cfs)

The Northern headwater of Exchange Lake is a small stream with good spawning and rearing habitat. Initially the stream flows through a grass meadow before entering forest cover. A full canopy along with considerable length of undercut banks provides good rearing cover though no fry were observed. Spawning gravel is patchy but of good quality. Substrate size increases during Section 3 and at Section 3: 100 m. The survey is terminated as the substrate composition becomes boulder/large cobble.

The banks of the stream were littered with pink carcasses (about 60) along with (8) adult pinks sighted in the stream. Possible use by coho, chum and sockeye salmon is likely.

Exchange Creek
106-30-85





Exchange Creek



1. The ITZ looking downstream from Section 11.



2. Section 3I looking at the creek mouth.

Exchange Creek



3. A shallow, wide channel with massive blowdown in the background of Section 4.



4. Moderate gradient and large cobble substrate of Section 8.

Exchange Creek



5. A major tributary flows from an underground cavern 10 m up from its confluence with Section 8, Survey Area "A".



6. A low flow barrier is created in Section 9 when flow seeps through the gravel.

Exchange Creek



7. The flow resumes in Section 10. Mid channel skunk cabbage indicates stable flow.



8. Mouth of Survey Area "B".

Exchange Creek
Survey Area "B"



9. Large boulders and bedrock dominate the substrate in Section 3.



10. Gradient becomes moderate in Section 5. ASA and rearing habitat improve.

Exchange Creek
Survey Area "B"



11. Fish habitat quality diminishes with increased gradient in Section 11.



12. This survey terminates at a 2 m barrier falls (background) at the end of Section 11.

Exchange Creek
Survey Area "C"

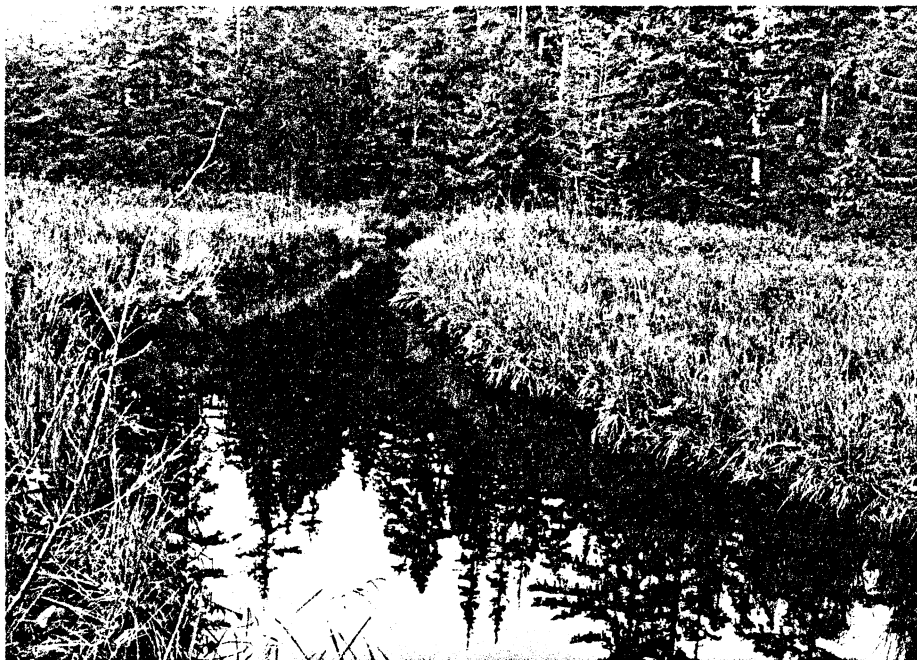


13. Confluence with Exchange Lake. Twelve pink salmon carcasses were observed along the banks near the mouth.



14. Section 1: Channel adopts a sinuous course through sumpy lowlands. Gravel/cobble riffles provide excellent spawning substrate.

Exchange Creek
Survey Area "D"



15. Mouth of survey area, north headwater to Exchange Lake.



16. Section 2: 0m; Good rearing cover with patchy ASA.

Exchange Creek
106-30-85

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
Survey Area "A"					Survey Area "B"				
1I	150	12.5	30	562.5	11	90	2.6	--	--
2I	400	6.7	5	134	Total				562.2m ²
3I	470	8.7	20	817.8	Survey Area "C"				
4	300	12.0	15	540	1	100	2.7	35	94.5
5	200	7.9	1	15.8	2	100	3.6	18	64.8
6	300	10.6	10	318	3	100	2.7	18	48.6
7	150	5.3	5	39.8	4	100	.9	5	4.5
8	300	4.0	1	12	Total				212.4m ²
9	200	3.2	--	--	Survey Area "D"				
10	300	9.1	2	54.6	1	100	3.8	15	57
11	120	11.2	--	--	2	100	2.0	20	40
Total				2494.5m ²	3	100	1.2	12	14.4
Survey Area "B"					Total				111.4m ²
1	300	4.8	5	72	Total ASA				3380.5m ²
2	200	7.3	5	73					
3	300	4.0	2	24					
4	200	2.4	4	19.2					
5	300	3.1	7	65.1					
6	200	4.0	4	32					
7	300	6.1	7	128.1					
8	200	4.5	10	90					
9	300	2.0	5	30					
10	200	7.3	2	29.2					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Creek

2. ADF&G Catalog No. 106-30-85

Survey Area "A"

Reach Number	1	1	1	2	2	2	2
1. Section Number	1I	2I	3I	4	5	6	7
2. Section Length	150	400	470	300	200	300	150
3. Compass Bearing	200	290	270	000	300	300	330
4. Gradient	0.5	0.5	0.5	1.0	1.0	1.0	1.0
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	A	A	A	A	A	A	A/B
7. Bank Stability	1/2	1/2	1/2	3/3	3/3	2/2	2/2
8. Bank Vegetation	5	5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	--	--	4	10	5	40	10
10. Undercut Bank Length	--	--	20	40	10	100	10
11. Stream Width:							
Channel	12.5	10.0	12.5	12.0	10.8	14.4	8.5
Water	12.5	6.7	8.7	12.0	7.9	10.6	5.3
12. Water Type %:							
SS	10	30	30	40	35	45	20
DS	--	50	20	10	60	5	30
SF	90	10	40	50	5	50	50
DF	--	10	10	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	2
Boulder	--	4	4	--	--	--	8
Large Cobble	--	6	11	5	5	5	5
Small Cobble	5	10	20	10	15	30	35
Gravel	60	45	40	20	35	45	30
Sand	30	25	20	61	35	20	15
Muck	5	10	5	4	10	--	--
Other	--	--	--	--	--	--	5/c
14. ASA %/Quality	30/2	5/2	20/2	15/1	1/2	10/2	5/2
15. Rearing Area %	--	5	10	30	80	40	60
16. Pool Cover %	--	--	6	10	5	40	10
17. Riffle Cover %	--	--	2	5	20	30	10
18. Fish Observed		SS	SS	SS	SS	SS	SS
	CO	CO	CO		CT	CT	CT
19. Sampling	N	N	N	N	Y	N	Y
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1I: Large, wide intertidal channel. Section end at first major bend where a major stream, 106-30-848, enters the left bank.

Section 3I: Ends at the ITZ terminus.

Section 4: Shallow, wide channel; massive blowdown area. Banks have been disturbed; mass wasting into streambed, channel braiding, dense riparian vegetation. Coho fry are common. ASA is abundant but poor quality due to interstitial fines.

22. Investigators Randy Ericksen

Date 6/26/83

LEVEL TWO HABITAT SURVEY

Section 5: Beaver dam blocks stream course at 40 m creating 140 m of pond. Resume flow at 180 m. Good rearing habitat.

Section 6: Bridge crossing at 35 m. Resume blowdown. Channel extremely braided.

Section 7: Blue clay deposit along left bank. This bank is eroding into the stream bed. Section ends at confluence with Survey Area "B".

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Creek 2. ADF&G Catalog No. 106-30-85

Survey Area "A"

Reach Number	3	3	4	4			
1. Section Number	8	9	10	11			
2. Section Length	300	200	300	120			
3. Compass Bearing	250	180	240	230			
4. Gradient	4.0	3.5	2.0	0.5			
5. Water Quality	1	1	1	1			
6. Bank Type	B	B	B	B			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1-4	1-4	1-5	1-5			
9. Debris Loading	20	15	5	5			
10. Undercut Bank Length	--	--	10	--			
11. Stream Width:							
Channel	4.6	5.2	9.1	11.2			
Water	4.0	3.2	9.1	11.2			
12. Water Type %: SS	45	75	60	70			
DS	5	--	5	30			
SF	50	25	35	--			
DF	--	--	--	--			
13. Substrate %:							
Bedrock	5	5	10	--			
Boulder	30	30	20	--			
Large Cobble	35	40	20	5			
Small Cobble	20	20	30	10			
Gravel	10	5	15	20			
Sand	--	--	5	30			
Muck	--	--	--	35			
Other	--	--	--	--			
14. ASA %/Quality	1/2	--	2/2	--			
15. Rearing Area %	5	20	30	40			
16. Pool Cover %	20	15	--	5			
17. Riffle Cover %	15	5	2				
18. Fish Observed	SS	SS	SS	SS			
19. Sampling	N	N	N	N			
20. Potential Barriers	N	6	N	N			
21. Enhancement/Rehab	N	N	N	N			

Section 8: Gradient increases. Substrate is composed mostly of large cobble and boulders. A major tributary enters the right bank at 160 m. This tributary is dammed near the confluence by beavers. Ten meters up stream the stream flows through an underground cave. A survey is impossible for this tributary. Coho fry were observed near the cave opening. (pH - 7.5; H₂O - 16.0°C)

Section 9: Bridge crossing at 100 m. Marker near bridge reads "Stream Culvert Survey #1 10-81". The stream seeps through the gravel for 15 m near the end of the section. This is a potential barrier during low flow.

22. Investigators Randy Ericksen Date 6/26/83

LEVEL TWO HABITAT SURVEY

Section 10: Low gradient. Stable flow. Skunk cabbage growing in mid channel.

Section 11: Marshy area. Section ends at Exchange Lake.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Creek 2. ADF&G Catalog No. 106-30-85
Survey Area "B"

Reach Number	1	1	1	1	2	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	300	200	300	200	300	200	300
3. Compass Bearing	340	330	270	280	270	330	290
4. Gradient	4.0	5.5	6.5	4.5	3.0	3.0	2.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	2/3
8. Bank Vegetation	1-4	1-4	1-4	1-4	1-4	1-4	1-4
9. Debris Loading	7	10	10	5	7	5	5
10. Undercut Bank Length	--	--	--	--	--	--	10
11. Stream Width:							
Channel	13.6	13.5	8.0	11.2	13.1	9.3	12.4
Water	4.8	7.3	4.0	2.4	3.1	4.0	6.1
12. Water Type %:							
SS	30	20	10	45	40	30	50
DS	5	5	10	5	20	10	10
SF	65	75	70	50	40	60	40
DF	--	--	10	--	--	--	--
13. Substrate %:							
Bedrock	--	--	25	5	5	15	5
Boulder	30	40	35	35	20	20	10
Large Cobble	10	20	15	20	30	30	40
Small Cobble	30	20	10	20	30	30	40
Gravel	25	15	10	15	20	15	10
Sand	5	3	5	5	--	--	5
Muck	--	--	--	--	--	--	--
Other	--	2/c	--	--	--	--	--
14. ASA %/Quality	5/3	5/2	2/2	4/2	7/2	4/2	7/2
15. Rearing Area %	30	10	5	5	15	7	20
16. Pool Cover %	15	20	5	5	15	4	5
17. Riffle Cover %	15	20	10	10	15	10	10
18. Fish Observed	SS	SS	SS	SS	SS	SS	SS
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Coho fry abundant. Gradient increases from 1.0 to 5.0% moving up stream.

Section 3: Steep gradient with bedrock outcroppings and large boulders. Stream enters a V-notch.

Section 5: Moderate gradient; largely cobble substrate. Good rearing & ASA. Coho fry are common.

Section 7: Blue clay deposits common along both banks, continuing through Section 10.

22. Investigators Randy Ericksen Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Creek 2. ADF&G Catalog No. 106-30-85

Survey Area "B"

Reach Number	2	2	3	3			
1. Section Number	8	9	10	11			
2. Section Length	200	300	200	90			
3. Compass Bearing	300	290	210	240			
4. Gradient	2.5	3.0	4.0	6.5			
5. Water Quality	1	1	1	1			
6. Bank Type	B	B	B	B			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1-5	1-4	1-4	1-4			
9. Debris Loading	5	10	10	3			
10. Undercut Bank Length	10	5	--	--			
11. Stream Width:							
Channel	8.6	7.2	7.3	5.2			
Water	4.5	2.0	7.3	2.6			
12. Water Type %: SS	25	25	40	40			
DS	5	5	--	15			
SF	70	70	60	40			
DF	--	--	--	5			
13. Substrate %:							
Bedrock	5	5	--	15			
Boulder	20	25	35	45			
Large Cobble	30	35	40	30			
Small Cobble	30	20	15	10			
Gravel	15	15	10	--			
Sand	--	--	--	--			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	10/2	5/2	2/2	--			
15. Rearing Area %	10	10	5	2			
16. Pool Cover %	--	15	10	3			
17. Riffle Cover %	5	5	5	2			
18. Fish Observed	CT	CT	CT	CT			
	SS	SS					
19. Sampling	N	N	N	N			
20. Potential Barriers	N	N	N	2			
21. Enhancement/Rehab	N	N	N	N			

Section 8: A 2 cfs tributary enters the right bank at 290 m. This tributary has a 12% gradient. Cutthroat trout were present.

Section 10: End blue clay deposits. Increased gradient. Stream enters a V-notch.

Section 11: Steep gradient, numerous bedrock outcroppings. Survey terminated at a 2 m barrier falls.

22. Investigators Randy Ericksen Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Lake 2. ADF&G Catalog No. 106-30-85
Survey Area "C"

Reach Number	1	1	1	2			
1. Section Number	1	2	3	4			
2. Section Length	100	100	100	100			
3. Compass Bearing	214	174	183	229			
4. Gradient	1.5	2.0	1.5	2.5			
5. Water Quality	1	1	1	1			
6. Bank Type	B/C	B/C	B/C	B/C			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1-5	1-5	1-5	1-5			
9. Debris Loading	5	8	5	7			
10. Undercut Bank Length	15	65	45	60			
11. Stream Width:							
Channel	2.7	5.4	2.7	1.8			
Water	2.7	3.6	2.7	.9			
12. Water Type %: SS	25	40	45	35			
DS	5	5	5	--			
SF	70	55	50	65			
DF	--	--	--	--			
13. Substrate %:							
Bedrock	--	--	--	--			
Boulder	--	--	--	5			
Large Cobble	--	--	--	25			
Small Cobble	55	50	45	35			
Gravel	45	50	50	30			
Sand	--	--	5	5			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	35/3	18/3	18/3	5/2			
15. Rearing Area %	20	35	40	30			
16. Pool Cover %	20	30	30	15			
17. Riffle Cover %	--	--	--	--			
18. Fish Observed (fry) SS	2	--	2	<12			
19. Sampling	Y	N	N	N			
20. Potential Barriers	N	N	N	N			
21. Enhancement/Rehab	N	N	N	N			

Section 1: Twelve adult pink salmon carcasses were observed along both banks near the confluence with Exchange Lake.

Narrow and confined at mouth, channel broadens under a conifer/alder canopy. Numerous cobble/gravel riffles provide excellent spawning substrate. Rearing habitat is limited by the paucity of pooling, "effective debris loading", and undercut bank length.

22. Investigators Ted Mickowski Date 9/27/83

LEVEL TWO HABITAT SURVEY

Section 2-3: Channel sinuosity and gradient increase. Several muskeg seeps enter channel from adjacent sumpy lowlands. Dense overhanging vegetation, moderate debris loading, and undercut/overhanging banks provide excellent rearing habitat. Spawning area is reduced but moderate in extent.

Section 4: Substrate size and channel gradient increase, demarcating Reach 2. Rearing habitat and SS observations were limited to the first 50 meters. Spawning substrate was also restricted to the first half of the section and was moderately compact.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Lake 2. ADF&G Catalog No. 106-30-85
North Headwater

Survey Area "D"

Reach Number	1	1	1				
1. Section Number	1	2	3				
2. Section Length	100	100	100				
3. Compass Bearing	265	283	335				
4. Gradient	<0.5	1.5	2.0				
5. Water Quality	3	3	3				
6. Bank Type	A	A	A				
7. Bank Stability	1(1)	1(1)	1(1)				
8. Bank Vegetation	1-5	1-5	1-5				
9. Debris Loading	3	6	5				
10. Undercut Bank Length	160	110	60				
11. Stream Width:							
Channel	4.0	4.6	3.3				
Water	3.8	2.0	1.2				
12. Water Type %: SS	30	25	20				
DS	40	20	25				
SF	30	55	55				
DF	--	--	--				
13. Substrate %:							
Bedrock	--	--	--				
Boulder	--	--	10				
Large Cobble	15	15	25				
Small Cobble	40	45	30				
Gravel	35	30	25				
Sand	10	10	10				
Muck	--	--	--				
Other	--	--	--				
14. ASA %/Quality	15/3	20/3	12/3				
15. Rearing Area %	70	40	35				
16. Pool Cover %	5	15	10				
17. Riffle Cover %	10	10	15				
18. Fish Observed (adult)	PS	PS	PS				
(mort.)	PS	PS	PS				
19. Sampling	Y	N	N				
20. Potential Barriers	N	N	N				
21. Enhancement/Rehab	N	N	N				

Section 1: 0m; Begin flat water section through grass meadow above lake. Pink salmon carcasses in stream.

60m; End flat water, begin stream flow. Adult pinks in stream. Many PS carcasses and bear sign.

Section 2: Many adult pinks and mortis. Stream becoming increasingly sinuous. 35m; Small trickle tributary right side. No habitat.

Section 3: 60m; Substrate size increasing. Isolated boulders present. 100m; Trickle tributary right side. No habitat.

Escapement - (8) adult pinks; (60) mortality pinks

22. Gerry Merrigan Date 9/27/83

FISH SAMPLING FORM

Stream Name Exchange Creek ADF&G Catalog No. 106-30-85 Date 6/26 & 9/27/83

Identify Survey Area A, B, C, D Water Temp. 13.0°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
					Survey Area "A"
1	1215	1810	SS - 2 CT - 1		Section 5: Just below bridge
2	1255	1750	SS - 1		Section 7
					Survey Area "B"
3	1315	1730	--		Section 1
		9/27/83			Survey Area "C"
4	1215	1300	--		Section 1: H ₂ O - 5.5°C
		9/27/83			Survey Area "D"
5	1229	1245	--		Section 1: 90m H ₂ O - 7.0°C

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

Exchange Creek

106-30-85

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
1964	9			
1965	1000			
1970	600			
1971	6000			
1972		1500		
1973	1000			
1974	470	5		
1975	2740	400		
1976	11,000			
1977	9273			
1978	300			
1979	2340			
1980	4300			
1981	2553			
1982	600			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas none 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove Head #1 2. ~~ADFG~~ ^{Anadromous Stream} Catalog No. 106-30-848
 3. Latitude 56°10'10" Longitude 133°05'05"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-217
 8. Bay/Drainage Exchange Cove 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 4, 5 13. Estimated Flow 2 cfs 14. Flow Stage 2
 15. Stream Temperature 15.5°C 16. pH 7.0 17. Beaver yes
 18. Temperature Sensitivity no
 19. Barrier none surveyed 20. Weather 3

Part III.

21. Intertidal
 A. Substrate: Fines 95% Gravel/S. Cob. 5%
 L. Cob/Boulder/Bedrock 0%
 B. Gradient 0.5%
 C. ASA % 1/poor
 D. Schooling no
 E. Shellfish no
 F. Anchorage Exchange Cove

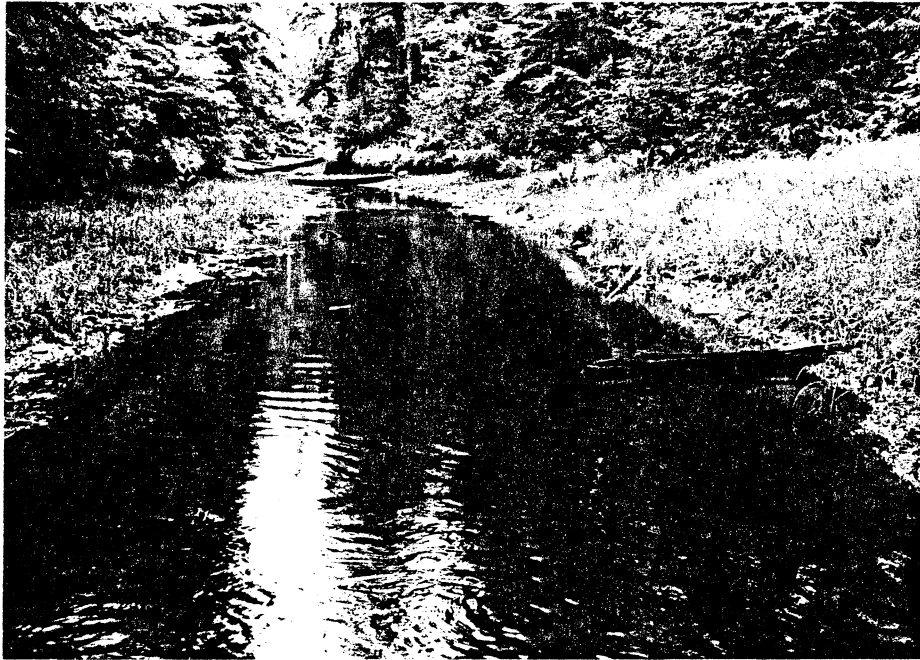
22. Comments

Stream Evaluation

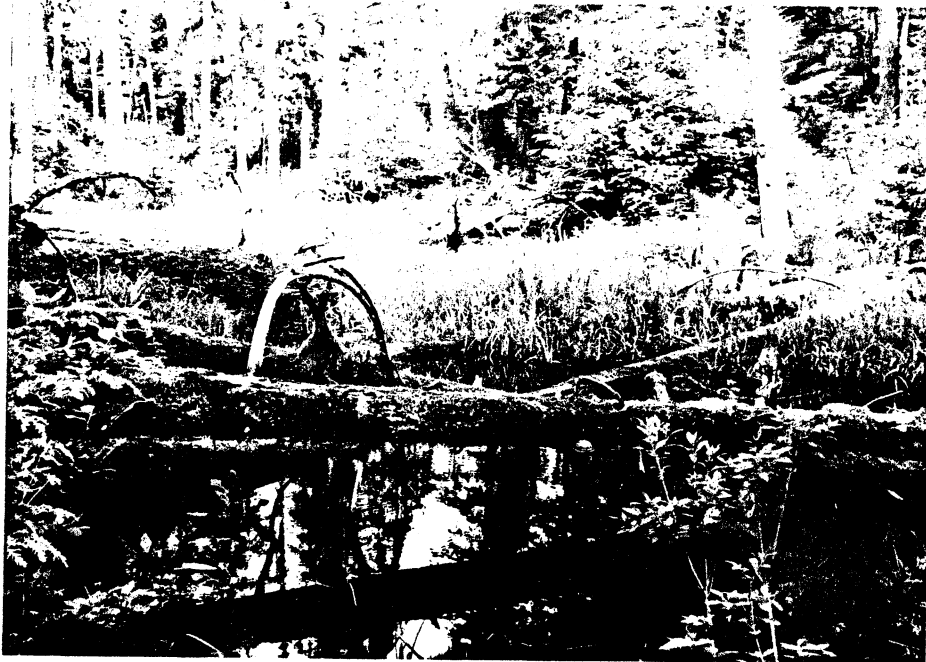
This stream was listed in the Anadromous Stream Catalog but was not found in ADF&G Commercial Fisheries Division records. The ITZ is extensive, measuring 820 m in length from the confluence with Section 1I in the ITZ of Exchange Creek, 106-30-85. Another small stream (Exchange Cove Head #2) enters the ITZ at 300 m. The ITZ is slough-like, cutting through a wide grassy channel. Rearing habitat is good, supporting a large population of coho fry and cottids. Substrate is composed almost entirely of sand and muck. The non-tidal portion of the stream contains 65 m of rearing habitat before a large beaver dam. This area is characterized by deep, slow moving water, grass banks, and heavy debris loading. Stream flow is stabilized by a large beaver system which dominates the stream hydrology for the next 500 m+ of area investigated. No significant ASA was found in the stream. It is probable that some of the small feeder streams entering the stream above the system provide some ASA as evidenced by the large number of rearing coho fry.

23. Randy Ericksen Date 6/27/83

Exchange Cove Head #1



1. The intertidal substrate is composed almost entirely of sand and muck. Taken just below the ITZ confluence with Exchange Cove Head #2.



2. A large beaver system dominates the hydrology of the stream 65 m up from the ITZ.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas none 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove Head #2 2. ADF&G Catalog No. none
 3. Latitude 56°10'05" Longitude 133°05'25"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-217
 8. Bay/Drainage Exchange Cove 9. Access 1, roaded 700 m above ITZ
 10. Present Land Use road crossing
 11. Historical Land Use none
 12. Stream Origin 4, 5 13. Estimated Flow 2 cfs 14. Flow Stage 2
 15. Stream Temperature 15°C 16. pH 7.5 17. Beaver yes
 18. Temperature Sensitivity no
 19. Barrier none surveyed 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 95 % Gravel/S. Cob. 5 %
 L. Cob/Boulder/Bedrock 0 %
 B. Gradient 0.5 %
 C. ASA % 1/poor
 D. Schooling no
 E. Shellfish no
 F. Anchorage Exchange Cove

22. Comments

Stream Evaluation

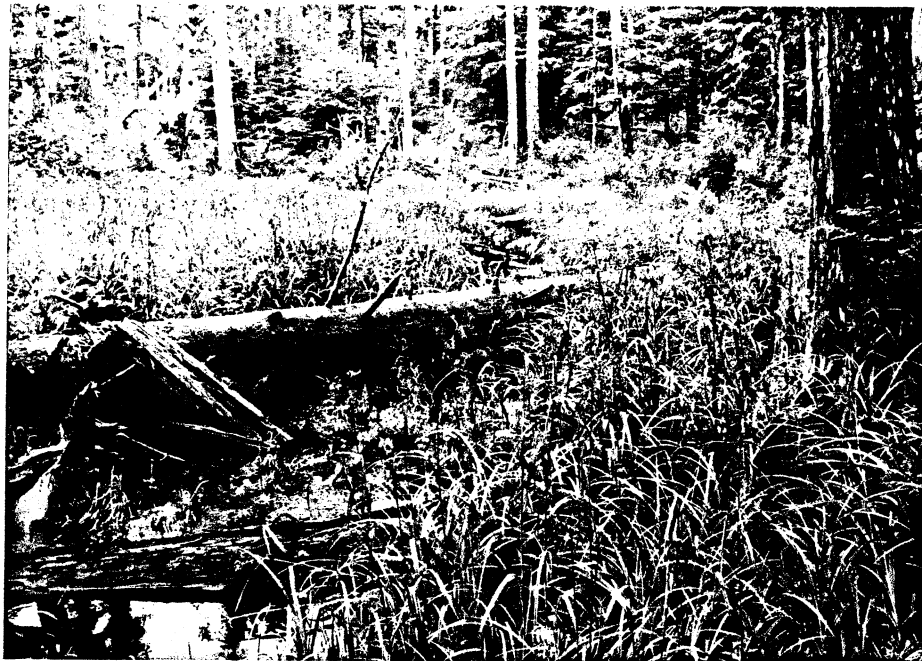
The ITZ merges with the ITZ of Exchange Cove Head #1 (106-30-848). The intertidal substrate is composed almost entirely of sand and muck. The ITZ meanders 320 m up from the confluence providing excellent rearing habitat. The non-tidal portion of the stream is nearly indistinguishable from the ITZ for 50 m before a large beaver pond. The beaver system dominates 300 m of stream before returning to a rearing slough 350 m up to the logging road. Reconnaissance 200 m upstream of the road disclosed no change in habitat. No significant ASA was found in this stream although coho fry were common throughout the area surveyed.

23. Investigators Randy Ericksen 24. Date 6/27/83

Exchange Cove Head #2



1. The ITZ looking downstream toward the confluence with Exchange Cove Head #1. Substrate is composed almost entirely of sand and muck.



2. Rearing habitat is good in slough-like portion of stream above the beaver system.

Stream Name Exchange Cove Head ADF&G Catalog No. n/a Date 6/27/83
#2

Identify Survey Area n/a Water Temp. 15.0°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1300	1440	CO - 1 SS - 3		Set just above ITZ

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 m
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove East #3 2. ADF&G Catalog No. n/a
 3. Latitude 56°10'44"^{#3} Longitude 133°04'45"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-25-579-105/106
 8. Bay/Drainage Exchange Cove 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 2.5 cfs 14. Flow Stage 2
 15. Stream Temperature 12°C 16. pH 7.8 17. Beaver no
 18. Temperature Sensitivity yes; low flow and muskeg seeps
 19. Barrier no 20. Weather 1

Part III.

21. Intertidal

- A. Substrate: Fines 5 % Gravel/S. Cob. 50 %
 L. Cob/Boulder/Bedrock 45 %
 B. Gradient 1.5 %
 C. ASA % 1
 D. Schooling Exchange Cove
 E. Shellfish moderate throughout cove
 F. Anchorage Exchange Cove

22. Comments

Stream Evaluation

This small stream is characterized by moderate to steep gradients, fast flows, coarse substrate and numerous seeps. Eighty-eight percent of the identified spawning area was located within 300 meters of the ITZ and rearing habitat was of marginal quality throughout the survey. The survey was terminated for lack of habitat and fish as the channel steeply climbed a bedrock/boulder notch. No rehabilitation or enhancement recommended.

23. Investigators Ted Mickowski 24. Date 6/26/83

LEVEL TWO HABITAT SURVEY

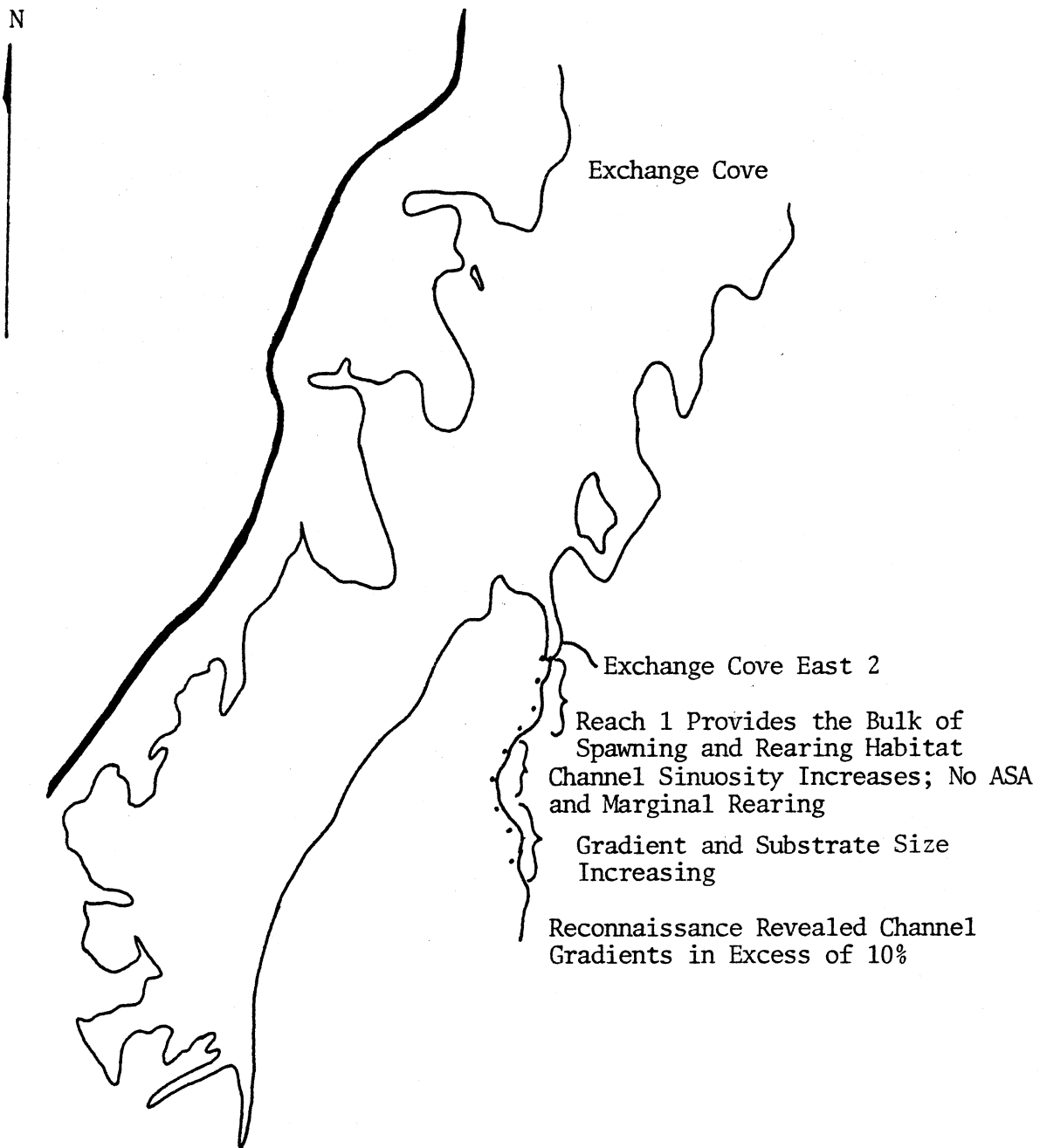
Reach Analysis

Reach 1 is characterized by moderate to steep gradients, fast flows, 88% of the available spawning area, and the bulk of available rearing habitat.

Increased channel sinuosity and bank undercutting, reduced gradient, extensive pooling and muskeg seeps typify Reach 2. No ASA and marginal rearing throughout.

Reach 3 steeply climbs a cobble/boulder channel culminating in a bedrock/boulder V-notch. Rearing and spawning habitat and fish sightings were minimal throughout.

Exchange Cove East #3



Prince of Wales Island

Exchange Cove East #3



1. The bulk of available rearing and spawning habitat is concentrated near the mouth.



2. This moderately sized, muskeg influenced stream empties into the head of a tidal lagoon.

Exchange Cove East #3



3. Increased channel sinuosity and bank undercutting, reduced gradient, extensive pooling, and muskeg seeps typify Reach 2.



4. Lack of habitat negated additional surveying. Reconnaissance revealed channel gradients exceeding 10% and nearly continuous bedrock cascades.

Exchange Cove East #3.

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	5.7	15	85.5					
2	100	1.9	10	19.0					
3	100	5.5	12	66.0					
6	100	3.7	5	18.5					
7	100	1.0	5	5.0					
Total				194.0m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Cove East #3 2. ADF&G Catalog No. n/a

Reach Number	1	1	1	2	2	3	3
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	190	186	199	199	86	165	189
4. Gradient	6	4	3	2	4	6	6
5. Water Quality	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	5	3	5	4	8	8	8
10. Undercut Bank Length	--	45	35	45	50	10	15
11. Stream Width:							
Channel	5.7	2.2	5.5	2.8	3.5	3.7	4.4
Water	5.7	1.9	5.5	2.2	1.3	3.7	1.0
12. Water Type %: SS	10	15	15	90	90	10	10
DS	10	--	5	--	5	5	5
SF	75	85	80	10	5	85	85
DF	5	--	--	--	--	--	--
13. Substrate %:							
Bedrock	10	5	--	--	--	10	--
Boulder	10	5	5	10	15	15	20
Large Cobble	15	25	35	40	40	40	40
Small Cobble	30	30	30	35	30	20	20
Gravel	30	30	30	15	15	15	20
Sand	5	5	--	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	15/3	10/3	12/3	--	--	5/3	5/3
15. Rearing Area %	15	10	10	5	5	5	10
16. Pool Cover %	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17. Riffle Cover %	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18. Fish Observed (fry) SS	>25	>12	>12	<6	<6	6	>12
(juv) DV						1	
19. Sampling	N	N	N	N	N	N	N.
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Section is delineated by treeline and an excellent gravel riffle providing 85.0m² of ASA, 44% of the total.

Section 2: Channel climbs narrow notch amidst dense overgrowth of alder & brush.

Section 4: Channel sinuosity increasing and gradient moderate. Muskeg seeps and dense brush throughout.

Section 6: Channel gradient increasing.

Reconnaissance beyond survey revealed channel gradients more than 10% bedrock cascades, and boulder pools. Debris & overgrowth remained dense. No fish or habitat were observed.

22. Investigators Ted Mickowski Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Cove East #3 2. ADF&G Catalog No. n/a

Reach Number	3						
1. Section Number	8						
2. Section Length	100						
3. Compass Bearing	199						
4. Gradient	7						
5. Water Quality	1/1						
6. Bank Type	B						
7. Bank Stability	1/1						
8. Bank Vegetation	1-5						
9. Debris Loading	5						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	2.5						
Water	1.9						
12. Water Type %:							
SS	8						
DS	2						
SF	90						
DF	--						
13. Substrate %:							
Bedrock	--						
Boulder	35						
Large Cobble	30						
Small Cobble	20						
Gravel	15						
Sand	--						
Muck	--						
Other	--						
14. ASA %/Quality	--						
15. Rearing Area %	2						
16. Pool Cover %	n/a						
17. Riffle Cover %	n/a						
18. Fish Observed							
19. Sampling	N						
20. Potential Barriers	N						
21. Enhancement/Rehab	N						

22. Investigators Ted Mickowski Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas n/a 2. Section Length n/a
3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove E. #2 2. ADF&G Catalog No. n/a
3. Latitude 56°10'44" Longitude 133°04'44"
4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 79-25-105
8. Bay/Drainage Exchange Cove 9. Access 2
10. Present Land Use none
11. Historical Land Use none
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.0 cfs 14. Flow Stage 2
15. Stream Temperature 12°C 16. pH 7.8 17. Beaver no
18. Temperature Sensitivity no
19. Barrier no 20. Weather 1

Part III.

21. Intertidal

- A. Substrate: Fines -- % Gravel/S. Cob. 20 %
L. Cob/Boulder/Bedrock 80 %
- B. Gradient 5 %
- C. ASA % 0
- D. Schooling Exchange Cove & bight
- E. Shellfish moderate throughout cove
- F. Anchorage Exchange Cove

22. Comments Stream Evaluation

This small stream rapidly negotiates a narrow bedrock V-notch directly above the ITZ. No fish or habitat were observed, however, 20+ SS fry were seen rearing in the fresh water/salt water interface near the mouth. The close proximity of Exchange Creek East #3 suggests these fry "ranged" from there. No rehabilitaion or enhancement recommended.

23. Investigators Ted Mickowski 24. Date 6/26/83

Exchange Cove East #2



1. This small, steep stream negotiates a narrow bedrock V-notch directly above the ITZ.



2. View down lower ITZ to a tidal lagoon and the mouth of Exchange Cove East #3.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas n/a 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Exchange Cove E. #1 2. ADF&G Catalog No. n/a
 3. Latitude 56°11'20" Longitude 133°04'00"
 4. Agency Unit 05 5. Mgmt. Area 539 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-25-105
 8. Bay/Drainage Exchange Cove 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.5 cfs 14. Flow Stage 2
 15. Stream Temperature 14°C 16. pH 6.8 17. Beaver yes
 18. Temperature Sensitivity yes; beaver impoundments & muskeg source
 19. Barrier no 20. Weather 1

Part III.

21. Intertidal

- A. Substrate: Fines 10% Gravel/S. Cob. 10%
 L. Cob/Boulder/Bedrock 80%
 B. Gradient 5%
 C. ASA % 0
 D. Schooling Exchange Cove
 E. Shellfish moderate in cove
 F. Anchorage Exchange Cove

22. Comments

Stream Evaluation

An old beaver dam in ill repair marks the interface between the ITZ and stream "flow". Low flow and dark water characterize this 6-8m wide "slough" as it meanders through dense debris to another beaver dam at 150 m. No fish or habitat were observed as the substrate was principally composed of muck and decaying organics. Fresh beaver cuttings and muskeg seeps were common. No enhancement or rehabilitation recommended.

23. Investigators Ted Mickowski 24. Date 6/22/83

Exchange Cove East #1



1. IT bedrock riffles drain this beaver/muskeg system.



2. View down an extensive ITZ/marsh complex. Substrate was heavily silted and no fish or ASA was observed.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Exchange Point 2. ADF&G Catalog No. 106-30-084
3. Latitude 56°11'15" Longitude 133°03'10"
4. Agency Unit 05 5. Mgmt. Area 540K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 26 Photo 93
8. Bay/Drainage Kashevarof Passage 9. Access 2
10. Present Land Use none
11. Historical Land Use none
12. Stream Origin 1, 3, 5, 6 13. Estimated Flow about 3 cfs 14. Flow Stage 2
15. Stream Temperature 12°C 16. pH 7.7 17. Beaver No
18. Temperature Sensitivity No
19. Barrier No 20. Weather 3

Part III.

21. Intertidal

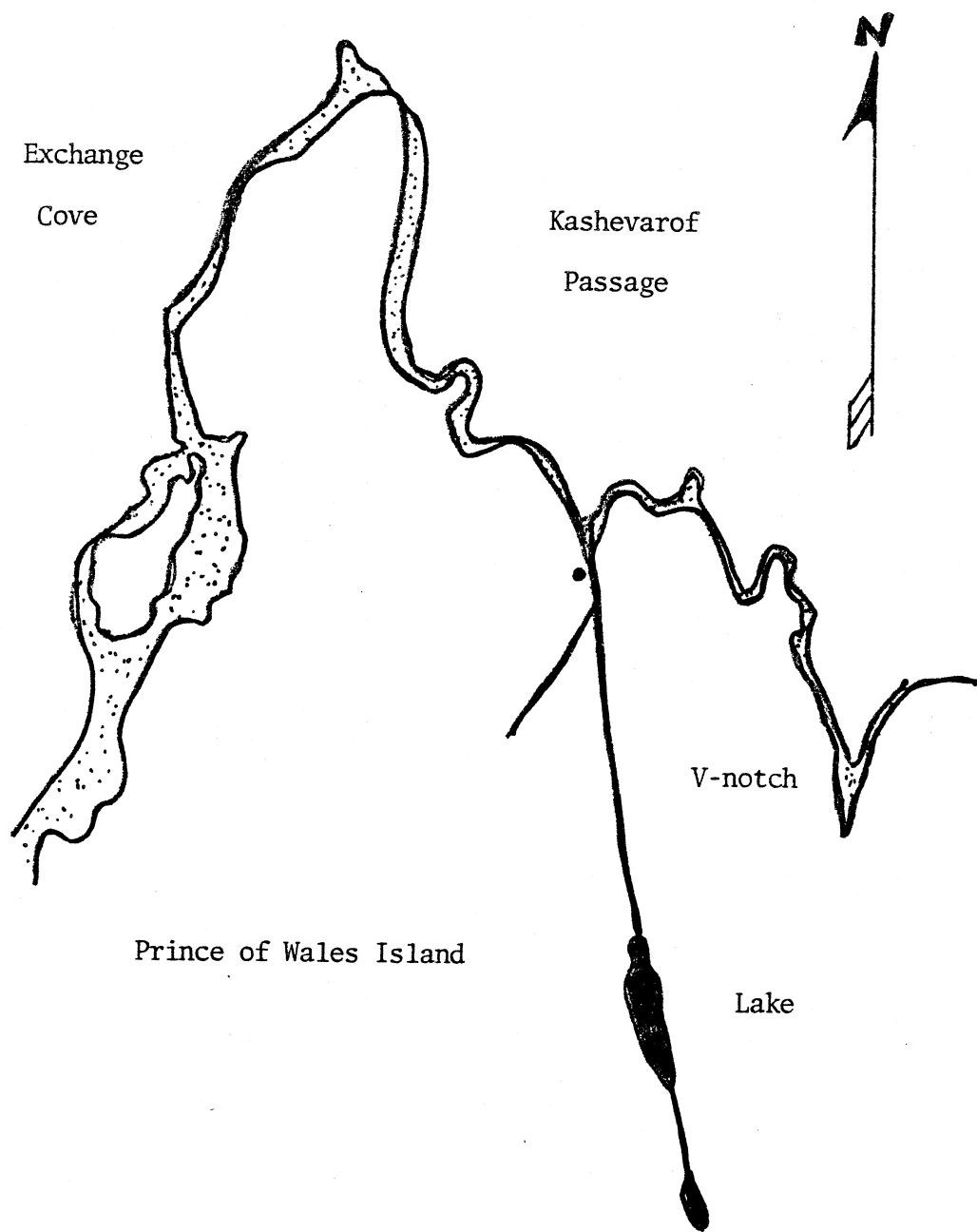
- A. Substrate: Fines 30 % Gravel/S. Cob. 30 %
L. Cob/Boulder/Bedrock 40 %
B. Gradient 4 %
C. ASA % 0
D. Schooling No, in bay only.
E. Shellfish Minimal
F. Anchorage Skiff only; vessel use Exchange Cove.

22. Comments

Stream Evaluation

A low productivity stream (only 1 DV fry sighted) that flows over boulder/cobble substrate between steep banks, and eventually up a V-notch. The stream has a steady 5% gradient up to two small lakes. No salmon fry were observed.

23. Investigators Gerry Merrigan 24. Date 6/26/83



Prince of Wales Island

Exchange Pt. Creek
106-30-084

Exchange Pt.
106-30-084



1. ITZ at low tide.



2. Mouth of stream with flow over boulder through V-notch.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Exchange Point 2. ADF&G Catalog No. 106-30-084

Reach Number							
1. Section Number	1						
2. Section Length	100						
3. Compass Bearing	170						
4. Gradient	5						
5. Water Quality	3						
6. Bank Type	B						
7. Bank Stability	1(2)						
8. Bank Vegetation	1,3-5						
9. Debris Loading	9						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	4.2						
Water	2.0/1.0						
12. Water Type %: SS	30						
DS	10						
SF	60						
DF	--						
13. Substrate %:							
Bedrock	--						
Boulder	35						
Large Cobble	25						
Small Cobble	30						
Gravel	10						
Sand	--						
Muck	--						
Other	--						
14. ASA %/Quality	5/2						
15. Rearing Area %	25						
16. Pool Cover %	10						
17. Riffle Cover %	20						
18. Fish Observed (fry)	DV-1						
19. Sampling	N						
20. Potential Barriers	N						
21. Enhancement/Rehab	N						

Section 1: 0m; Steep vanked V-notch. Flow over boulder/cobble.
75m; Tributary right side. No habitat.
100m; Heavy blowdown and cover. Continued 5% over boulder/cobble.

Total ASA: 15.0m²

22. Investigators Gerry Merrigan Date 6/26/83

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
3. Historical Fish Species PS

Part II.

1. Stream Name N. Ragged Cove 2. ADF&G Catalog No. 106-30-083
3. Latitude 56°09'40" Longitude 133°03'20"
4. Agency Unit 05 5. Mgmt. Area 540K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 25 Photo 107
8. Bay/Drainage Ragged Cove 9. Access 2
10. Present Land Use none
11. Historical Land Use none
12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow about 2 cfs 14. Flow Stage 2
15. Stream Temperature 16°C 16. pH 7.2 17. Beaver Yes
18. Temperature Sensitivity Yes; slow flowing with southern exposure
19. Barrier Yes; beaver dam; Section 10:20. Weather 3
50m

Part III.

21. Intertidal

A. Substrate: Fines 20% Gravel/S. Cob. 60%
L. Cob/Boulder/Bedrock 20%

B. Gradient 2%

C. ASA % Patches only; poor quality.

D. Schooling high tide only

E. Shellfish none observed

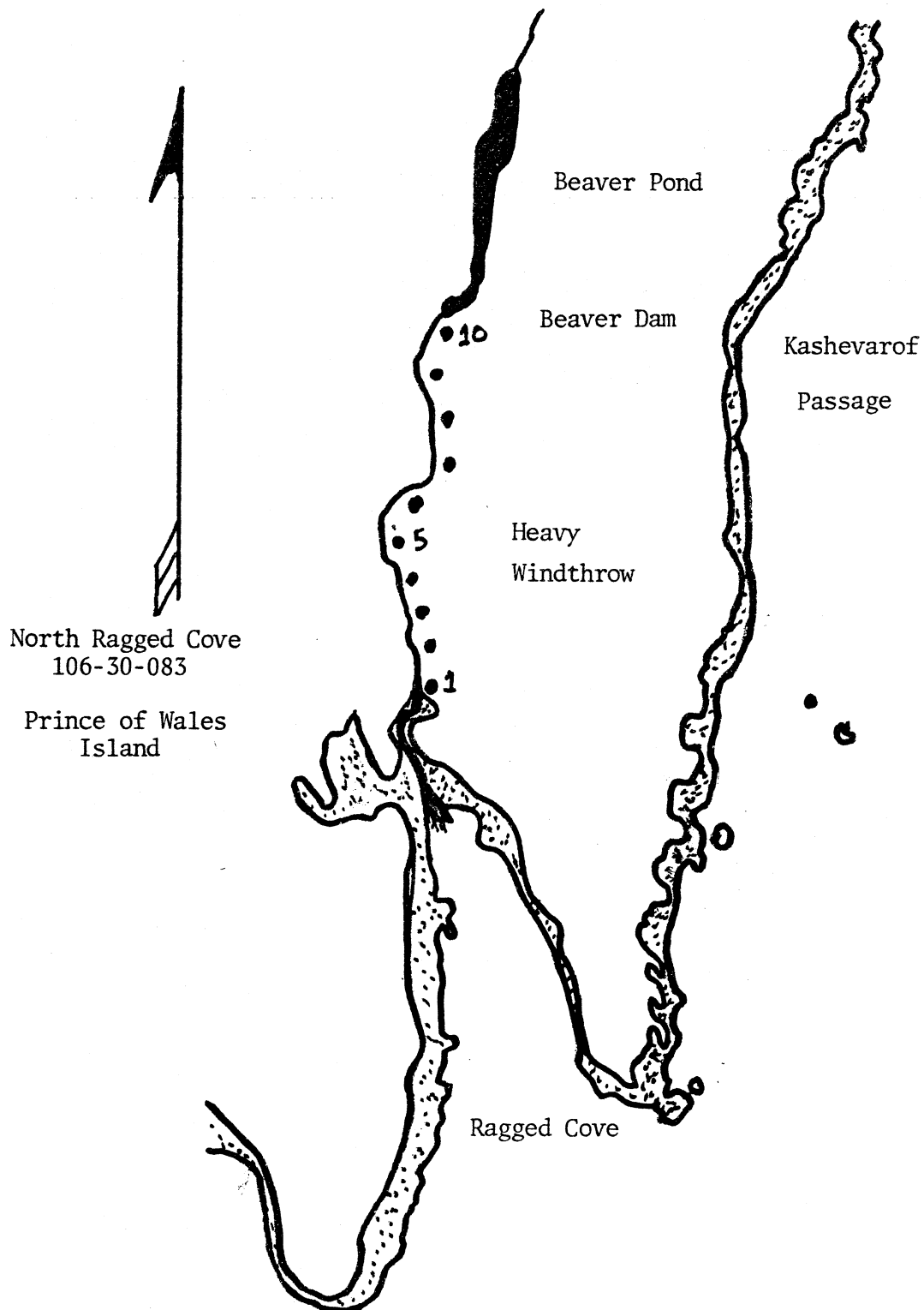
F. Anchorage exposed cove

22. Comments

Stream Evaluation

This is a low productivity beaver/muskeg stream with little fish habitat other than rearing potential. No coho fry were observed, but DV trout fry were prevalent throughout the stream. Heavy blowdown is also common as the cove and stream mouth is oriented to the S.E. prevailing winds, hence the name, Ragged Cove.

23. Investigators Gerry Merrigan 24. Date 6/24/83



North Ragged Cove
106-30-083



1. Upper ITZ rearing pools containing coho fry.

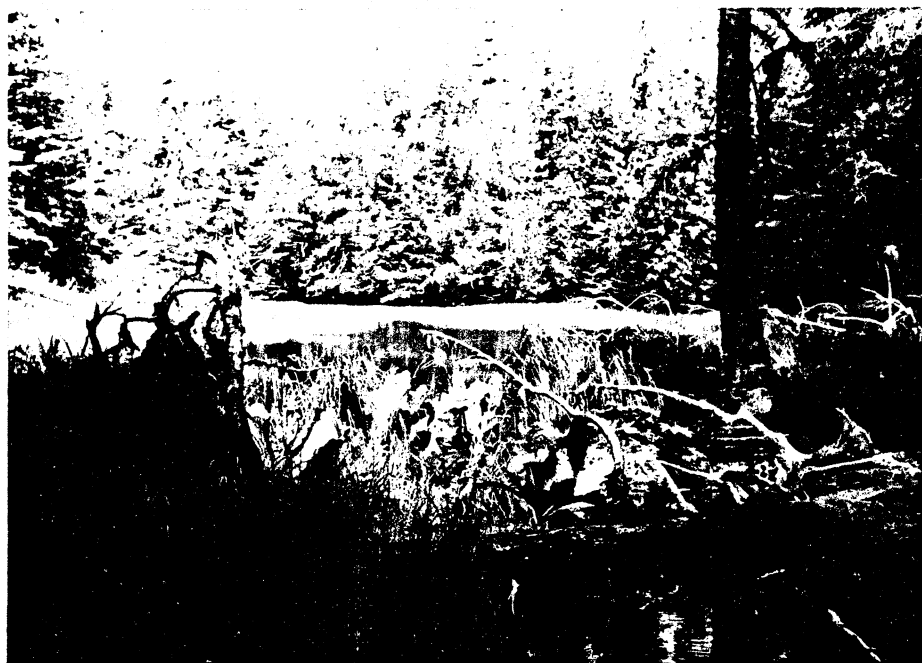


2. Downstream view of lower ITZ with beach debris.
Cove has open southeast exposure.

North Ragged Cove
106-30-083



3. Mouth of stream with slow velocity flows.
Forbs in stream, right bank.



4 Overgrown beaver dam (1 x 30m) at
Section 10: 50m.

North Ragged Cove
106-30-083

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	3.0	5	15.0					
2	100	3.3	5	16.5					
3	100	1.0	--	--					
4	100	2.0	--	--					
5	100	1.7	--	--					
6	100	5.0	--	--					
7	100	1.0	5	5.0					
8	100	2.2	10	22.0					
9	100	2.2	7	15.4					
10	50	3.0	--	--					
Total				73.9m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name North Ragged Cove 2. ADF&G Catalog No. 106-30-083

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	340	335	355	350	30	65	345
4. Gradient	1	1	1.5	2	2	2	1
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	A	A	A/B	B	B	B	A
7. Bank Stability	1(1)	1(1)	1(2)	2(2)	2(2)	2(2)	2(1)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	7	16	4	5	25	20	16
10. Undercut Bank Length	60	50	25	--	--	--	60
11. Stream Width:							
Channel	5.2	3.9	6.0	2.2	2.2	5.2	2.8
Water	3.0	3.3	1.0	2.0	1.7	5.0	1.0
12. Water Type %:							
SS	70	60	60	50	45	60	50
DS	10	20	5	20	15	10	20
SF	20	20	35	30	40	30	30
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	5	10	10	20	--
Boulder	3	3	15	15	20	20	--
Large Cobble	10	10	20	20	20	15	20
Small Cobble	20	20	30	15	20	15	20
Gravel	50	40	25	30	20	25	40
Sand	17	27	5	10	10	5	10
Muck	--	--	--	--	--	--	10
Other	--	--	--	--	--	--	--
14. ASA %/Quality	5/2	5/1	--	--	--	--	
15. Rearing Area %	60	60	40	30	30	30	35
16. Pool Cover %	15	35	5	2	40	35	10
17. Riffle Cover %	5	50	15	25	50	50	15
18. Fish Observed (fry)	DV	DV	DV	DV	DV	--	DV
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: 0m; Slow velocity, wide, shallow stream with heavy aquatic vegetation on substrate.

Section 2: Forbs midstream. Heavy blowdown.

Section 3: 50m; Banks steepening. Increased boulder and large cobble in substrate.

Section 4: 0m; Bedrock exposure.

50m; Debris jam.

70m; Moderate blowdown.

22. Investigators Gerry Merrigan Date 6/24/83

LEVEL TWO HABITAT SURVEY
North Ragged Cove
106-30-083

Section 5: Heavy blowdown and midstream forbs.

Section 6: 0m; Heavy blowdown for 60 meters.

Section 7: 0m; Midstream forbs. Banks flattening out and gradient decreasing. Increase in aquatic vegetation on substrate.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name North Ragged Cove 2. ADF&G Catalog No. 106-30-083

Reach Number	1	1	1				
1. Section Number	8	9	10				
2. Section Length	100	100	50				
3. Compass Bearing	340	020	060				
4. Gradient	1	1	1				
5. Water Quality	3	3	3				
6. Bank Type	A	A	A				
7. Bank Stability	1(1)	1(1)	1(1)				
8. Bank Vegetation	1,3-5	1,3-5	1,3-5				
9. Debris Loading	6	8	7				
10. Undercut Bank Length	140	60	25				
11. Stream Width:							
Channel	2.2	3.0	3.0				
Water	2.2	2.2	3.0				
12. Water Type %: SS	45	65	70				
DS	35	10	20				
SF	20	25	10				
DF	--	--	--				
13. Substrate %:							
Bedrock	--	--	--				
Boulder	--	--	--				
Large Cobble	10	20	15				
Small Cobble	10	20	25				
Gravel	40	30	30				
Sand	20	15	10				
Muck	20	15	20				
Other	--	--	--				
14. ASA %/Quality	10/1	7/1	--				
15. Rearing Area %	40	50	70				
16. Pool Cover %	15	15	10				
17. Riffle Cover %	10	20	15				
18. Fish Observed (fry)	DV	DV	DV				
19. Sampling	N	N	N				
20. Potential Barriers	N	N	Y4				
21. Enhancement/Rehab	N	N	N				

Section 8: 0m; Begin grass meadow.

Section 9: 65m; Banks steepening, forbs in stream.

Section 10: 50m; Beaver dam (1 x 30m), old but in good repair. No active cutting. Deer sign noted.

22. Investigators Gerry Merrigan Date 6/24/83

FISH SAMPLING FORM

Stream Name North Ragged Cove ADF&G Catalog No. 106-30-083 Date 6/24/83

Identify Survey Area A Water Temp. 16°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1455	1600	--		Section 1: 50m

This form is used to record fish caught during Level Three, Four, or Five Surveys.

North Ragged Cove
106-30-083

-141-

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length n/a
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Ragged Cove #1 2. ADF&G Catalog No. --
3. Latitude 56°09'35" Longitude 133°03'15"
4. Agency Unit 05 5. Mgmt. Area 540K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 25 Photo 108
8. Bay/Drainage Ragged Cove 9. Access 2
10. Present Land Use none
11. Historical Land Use none
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 1 cfs 14. Flow Stage 2
15. Stream Temperature 13°C 16. pH 6.5 17. Beaver no
18. Temperature Sensitivity no
19. Barrier no 20. Weather 3

Part III.

21. Intertidal

- A. Substrate: Fines 20 % Gravel/S. Cob. 50 %
L. Cob/Boulder/Bedrock 30 %
B. Gradient 3 %
C. ASA % High tide or in bay.
D. Schooling moderate
E. Shellfish exposed area
F. Anchorage

22. Comments Stream Evaluation

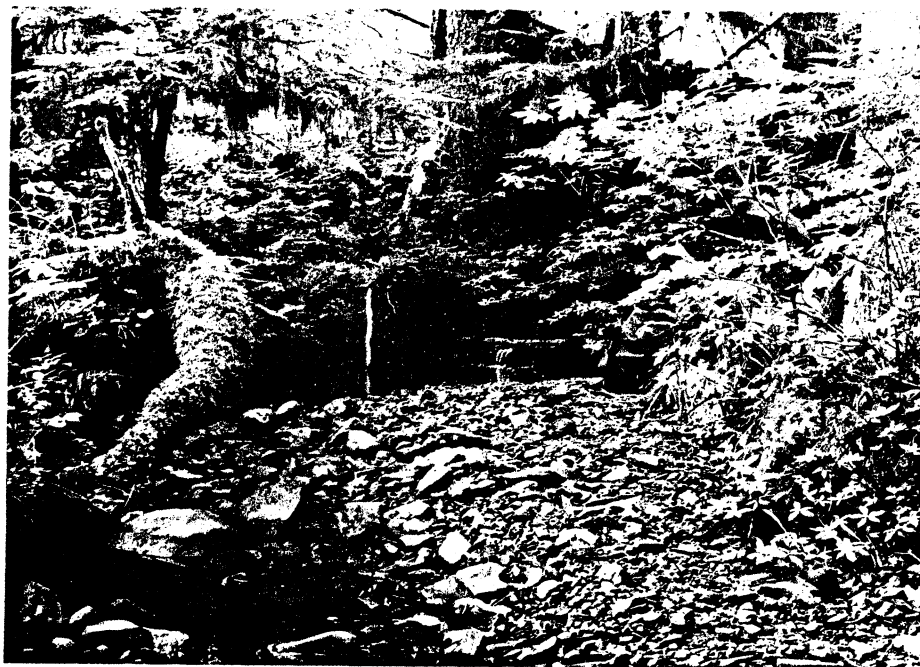
The stream has a large ITZ with a grass meadow. Coho and DV fry were observed in upper ITZ. The stream is light tan in color and has cobble/boulder substrate, strewn with debris. Channel width is 2.0 meters, and water width is 1.0 meter at the mouth, bearing 325 degrees. Rearing habitat is present for 10 meters whereupon the gradient increases from 3% to 9%.

23. Investigators Gerry Merrigan 24. Date 6/24/83

Ragged Cove #1



1. Upper intertidal rearing pools in grass meadow.



2. Mouth of stream with boulder/cobble substrate.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length --
 3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #6 2. ADF&G Catalog No. n/a
 3. Latitude 56°08'40" Longitude 133°04'00"
 4. Agency Unit 05 5. Mgmt. Area 540K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 25 Photo 109
 8. Bay/Drainage Whale Pass 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow <1 cfs 14. Flow Stage 2
 15. Stream Temperature 13°C 16. pH 6.5 17. Beaver No
 18. Temperature Sensitivity No
 19. Barrier No 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 60 % Gravel/S. Cob. 15 %
 L. Cob/Boulder/Bedrock 25 %
 B. Gradient 17 %
 C. ASA % 0
 D. Schooling Yes, mostly rearing.
 E. Shellfish In bay.
 F. Anchorage

22. Comments

Stream Evaluation

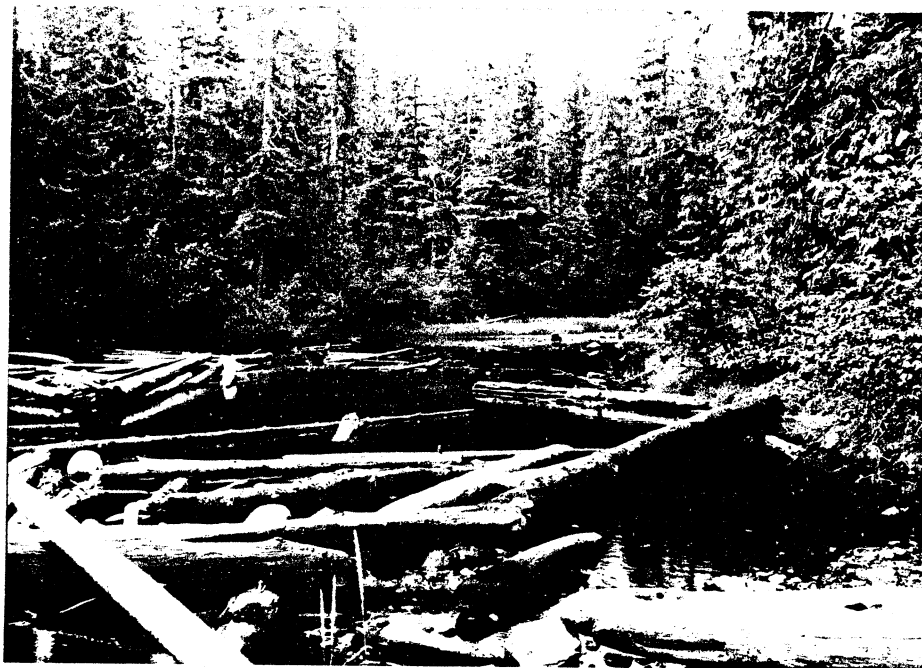
This stream consists of a rearing slough through overhanging grass banks for 50 meters until going underground intermittently. The substrate is sand and gravel with the stream about 1 meter in width; heading 00°N at .5% gradient with no ASA. Many coho fry were observed in an intertidal rearing pond of the stream's ITZ.

23. Investigators Gerry Merrigan 24. Date 6/24/83

Whale Pass #6



1. Downstream view of lower ITZ outlet from rearing pond.



2. Intertidal rearing pond thick with coho fry.

Whale Pass #6



3. Stream is rearing slough through grass meadow.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 130 meters
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #5 2. ADF&G Catalog No. n/a
3. Latitude 56°08'00" Longitude 133°04'35"
4. Agency Unit 05 5. Mgmt. Area 540K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 25 Photo 111
8. Bay/Drainage North Whale Pass 9. Access 2
10. Present Land Use none
11. Historical Land Use 20 year old clearcut on north (right) side.
12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow 1.5 cfs 14. Flow Stage 2
15. Stream Temperature 15.5 16. pH 6.5 17. Beaver Yes
18. Temperature Sensitivity Yes, slow flowing beaver system with SE exposure.
19. Barrier Yes, beaver dams. 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 30 % Gravel/S. Cob. 30 %
L. Cob/Boulder/Bedrock 40 %
B. Gradient 2 %
C. ASA % --
D. Schooling No, high tide only.
E. Shellfish Abundant
F. Anchorage In Bay.

22. Comments

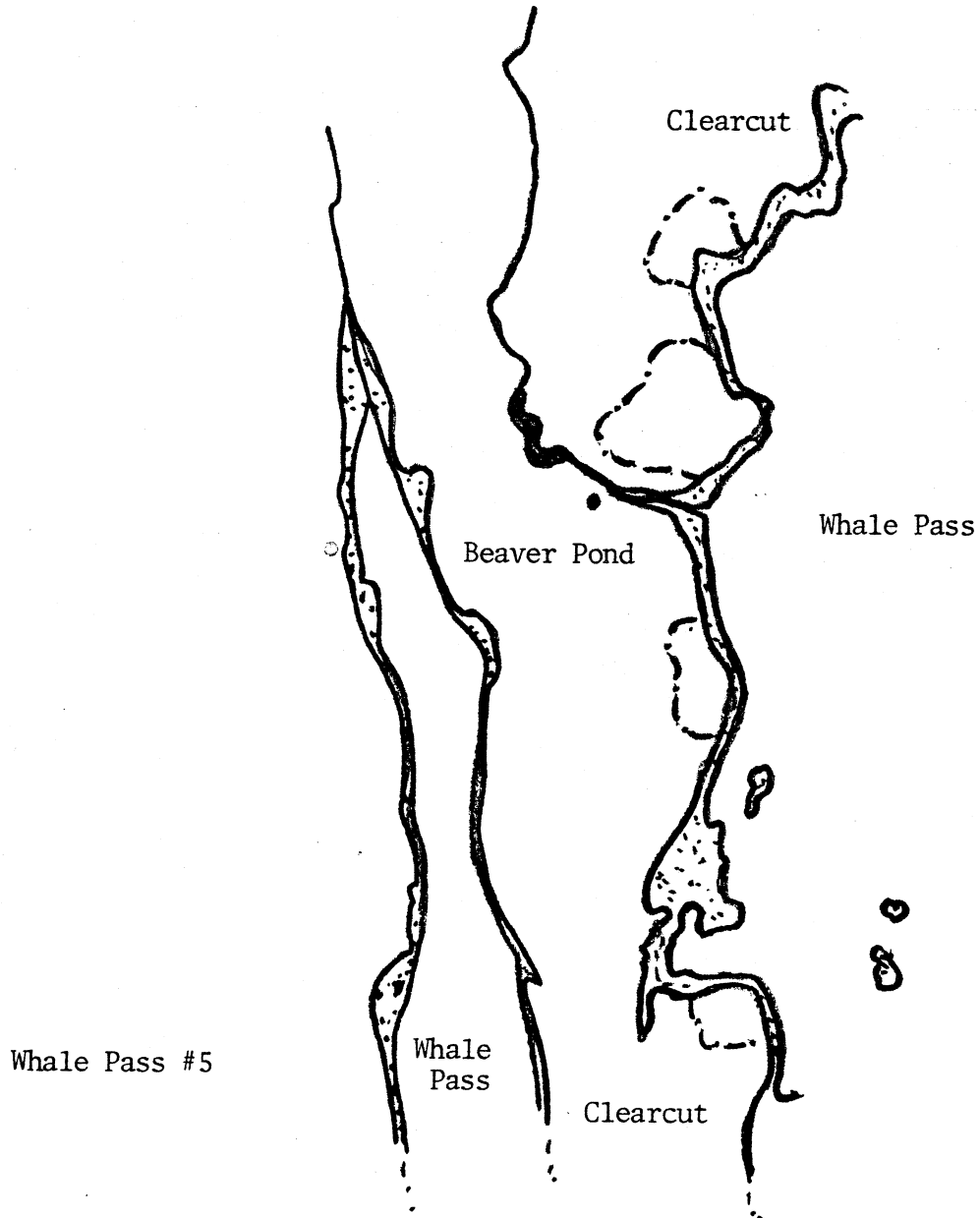
Stream Evaluation

This is a low productivity beaver/muskeg system with no fish observed, but potential for rearing habitat. A 20-25 year old unit is located on the right side of the ITZ and stream.

23. Investigators Gerry Merrigan 24. Date 6/24/83



Prince of Wales Island



Whale Pass #5



1. ITZ and mouth of Whale Pass #5.



2. Beaver pond from beaver dam, Section 1: 130m.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #5

2. ADF&G Catalog No. n/a

Reach Number	1						
1. Section Number	1						
2. Section Length	130						
3. Compass Bearing	355						
4. Gradient	1						
5. Water Quality	4						
6. Bank Type	A						
7. Bank Stability	1(1)						
8. Bank Vegetation	1,3-5						
9. Debris Loading	12						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	2.0						
Water	2.0						
12. Water Type %:							
SS	75						
DS	10						
SF	15						
DF	--						
13. Substrate %:							
Bedrock	--						
Boulder	--						
Large Cobble	10						
Small Cobble	10						
Gravel	30						
Sand	20						
Muck	30						
Other	--						
14. ASA %/Quality	--						
15. Rearing Area %	60						
16. Pool Cover %	10						
17. Riffle Cover %	--						
18. Fish Observed	--						
19. Sampling	Y						
20. Potential Barriers	Y4						
21. Enhancement/Rehab	N						

Section 1: 50m; Blownout beaver dam.

130m; Old but stable beaver dam. Pond at low water level.

22. Investigators Gerry Merrigan

Date 6/24/83

FISH SAMPLING FORM

Stream Name Whale Pass #5 ADF&G Catalog No. n/a Date 6/24/83

Identify Survey Area A Water Temp. 15.5 Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1130	1145	--		ITZ

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A,B,C,D,D-1,D-2,E,F 2. Section Length variable
3. Historical Fish Species PS & CS

Part II.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82
3. Latitude 56°07'55" Longitude 133°05'15"
4. Agency Unit 05 5. Mgmt. Area 540 K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 8-26-79 12 24 610050 579-215
8. Bay/Drainage Whale Pass 9. Access roaded around lakes
10. Present Land Use road crossings are frequent and logging is proposed along
some survey areas
11. Historical Land Use none
12. Stream Origin 1, 4, 5 13. Estimated Flow 10 cfs 14. Flow Stage 2
15. Stream Temperature 17°C 16. pH 8.0 17. Beaver yes
18. Temperature Sensitivity yes
19. Barrier several barriers are found throughout the system 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 2 % Gravel/S. Cob. 65 %
L. Cob/Boulder/Bedrock 33 %
B. Gradient 2.0 %
C. ASA % 5/fair
D. Schooling no
E. Shellfish yes
F. Anchorage good harbor near mouth

22. Comments

Stream Evaluation

This stream system is exceedingly complex and encompasses a large area. Overall the system is stable. Flow is regulated by the numerous lakes and beaver ponds interspersed throughout the stream system. Fish habitat is extremely varied and is described in the Survey Area Analysis. Logging activity is limited to road crossings at present, but units are proposed adjacent to Survey Area B.

23. Investigators Randy Ericksen 24. Date 6/23&24/83

Squaw Creek
106-30-82

Survey Area A: (pH - 8.0, H₂O temperature - 17.0°C, flow - 10 cfs)

This survey area contains 85% of the ASA in Squaw Creek. Habitat is variable but overall very stable because of a reservoir effect created by the numerous beaver systems and lakes. The first reach is characterized as having a wide, shallow channel. ASA is plentiful but water velocities are marginal for proper intergravel aeration. Skunk cabbage frequently grows in the stream channel indicating a low but stable flow. A major cascade 1100 m up from the ITZ is a potential barrier to pink and chum salmon, blocking access into Survey Areas C-F. Coho fry were found in all survey areas. Above the cascade, fish habitat is good for about 500 m before becoming sinuous and slough-like ending at Lake I. Lake I and Lake II are separated by a beaver system containing no ASA.

Survey Area B: (pH - 7.0, H₂O temperature - 15.0°C, flow - 3 cfs)

The survey area begins at Section 3 of Survey Area A. The dominant feature of this area is a 1500 m length of beaver system. Beginning 115 m up from the confluence with Area A, the stream enters a beaver complex situated in a wide, grassy floodplain. Rearing habitat is good to excellent, but ASA is negligible. A 200 m section just above the beaver system contains 58% of the ASA in the survey area. After this section, the stream becomes steep with large cobble substrate as it enters a V-notch. Fish habitat diminishes moving up the V-notch. About 400 m downstream of a road crossing, massive blowdown and bank slippage have occurred. A proposed logging unit is located just upstream of this unstable area. Harvesting of this unit could aggravate the windthrow and erosion problems if proper precautions are not implemented. The survey area terminates at the road crossing.

Survey Area C: (pH - 7.5, H₂O temperature - 18.5°C, flow - 2 cfs)

Beginning at the southern end of Lake II the survey area travels through grassy marsh area. The stream enters the forest 500 m up from the lake and continues up to an 8 m barrier falls. The best habitat in this survey area is in the transitional zone between the low gradient and fine substrate of the first section and the moderate to steep gradient and large substrate found in the last section.

Survey Area D: (pH - 8.0, H₂O temperature - 18.0°C, flow - 4 cfs)

This survey area begins at the southeast corner of Lake II. An excellent pool/riffle ratio, undercut banks, and small cobble substrate provide consistently good fish habitat throughout the survey area, ending at Lake III.

Squaw Creek
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Survey Area D-1: (pH - 8.0, H₂O temperature, 14.0°C, flow - 2 cfs)

Beginning at Section 2 of Survey Area D the stream provides good fish habitat, good pool/riffle ratio, small cobble substrate, and good cover. Moving upstream, fish habitat gradually diminishes with increased gradient. Substrate is comprised largely of large cobble and boulders. Pool formation is minimal.

Survey Area D-2: (pH - 9.0, H₂O temperature, 14.0°C, flow - 2 cfs)

This survey area is the only significant inlet stream to Lake III. The survey originates at a marshy region at the southern end of the lake. Above this region is a reach of excellent rearing habitat and good ASA. Fish habitat then diminishes with increased gradient.

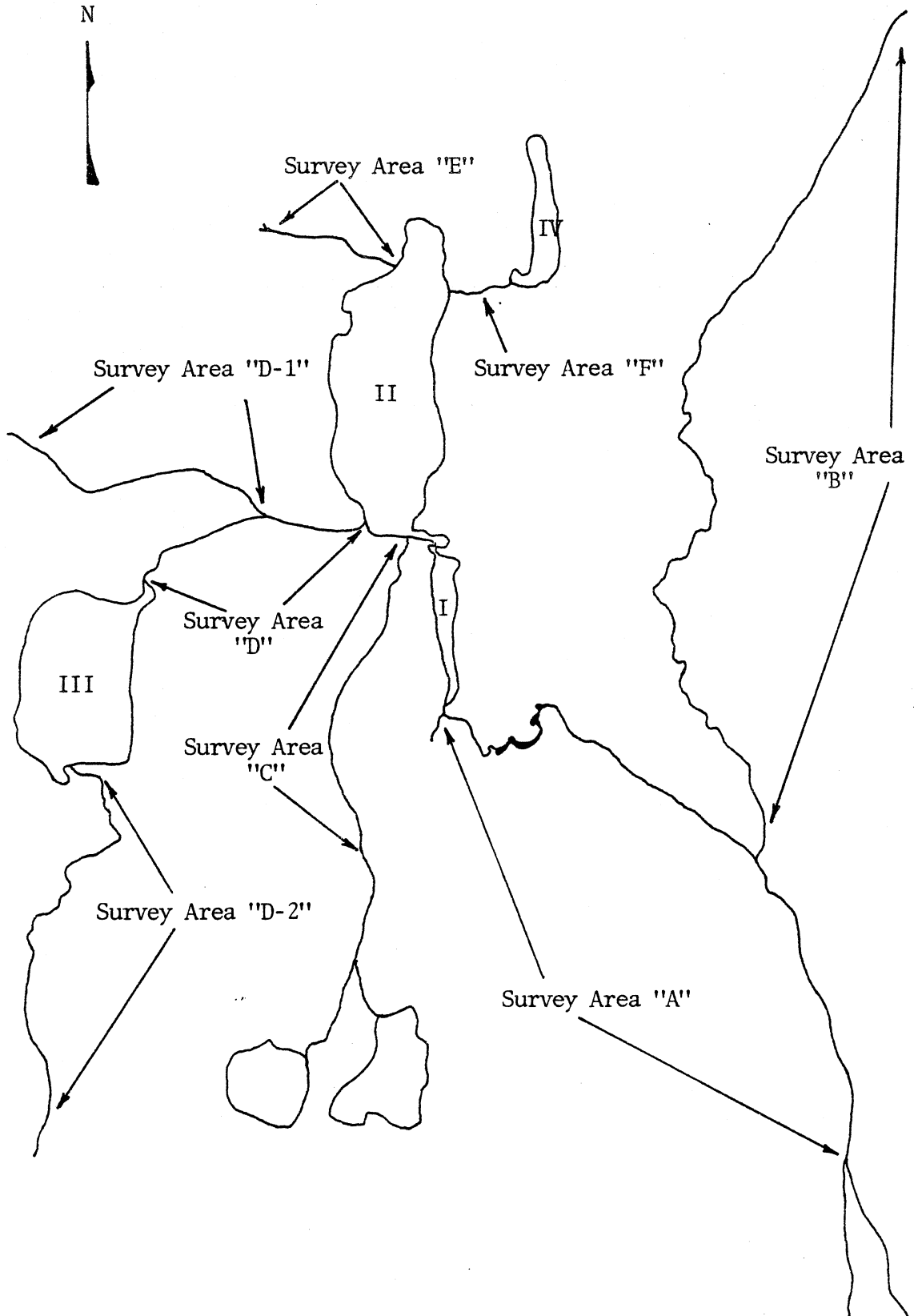
Survey Area E: (pH - 8.5, H₂O temperature - 12.0°C, flow - 2 cfs)

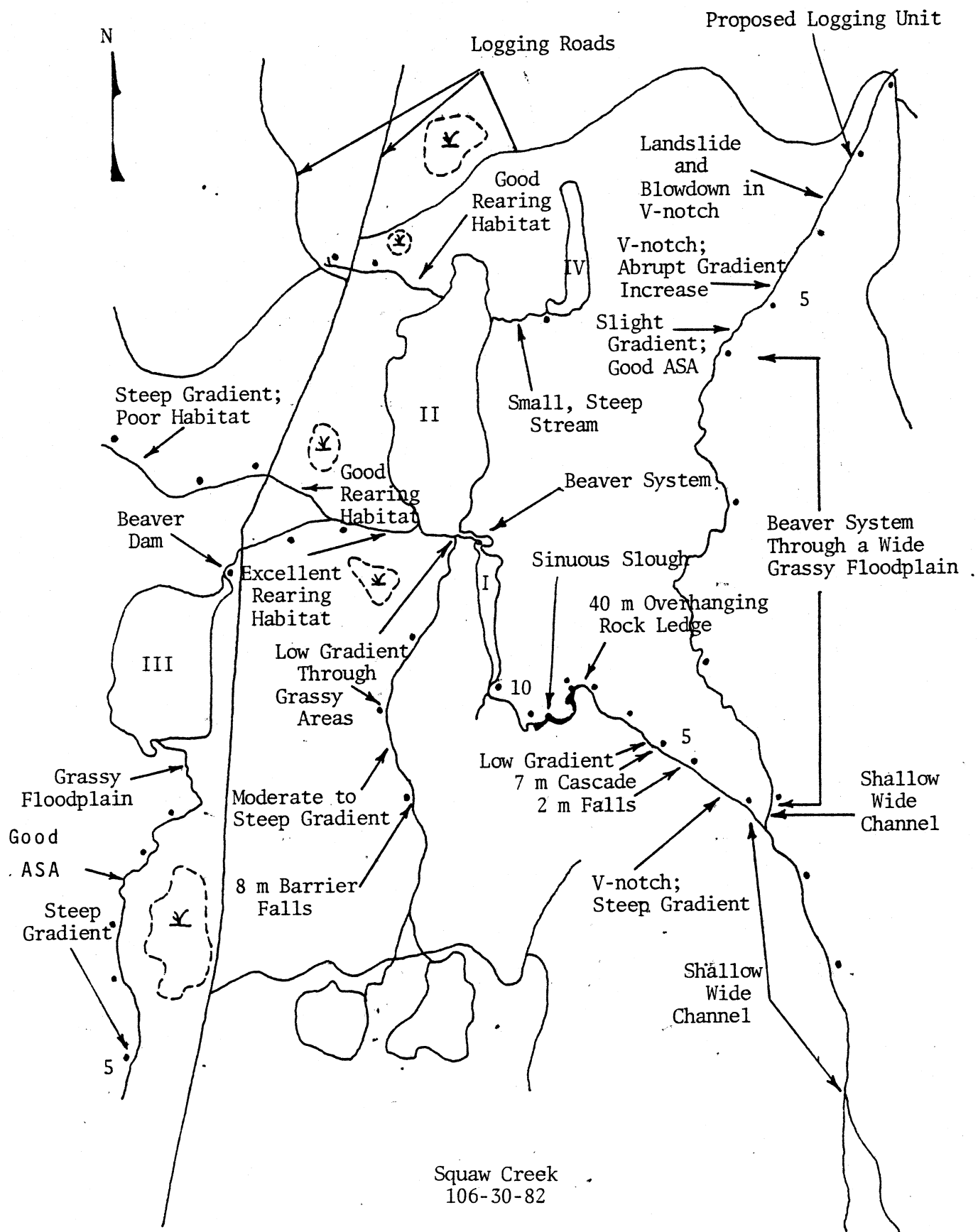
This survey area begins at the northwest end of Lake II. Rearing habitat is good throughout the survey area, but ASA is limited by low flow and substrate fines.

Survey Area F: (pH - 7.0, H₂O temperature - 18.0°C, flow - 1 cfs)

This survey area is significant only in that it drains Lake IV. Beginning at the northeast end of Lake II, rearing habitat is good but soon deteriorates due to steep gradient and low flow.

Squaw Creek
106-30-82





Squaw Creek
106-30-82



1. The ITZ looking at the stream mouth.



2. The ITZ looking downstream from the stream mouth.

Squaw Creek
106-30-82



3. Forbs growing in shallow, wide channel of Section 1.



4. Gradient and substrate size increase as the stream enters a V-notch in Section 4.

Squaw Creek
106-30-82

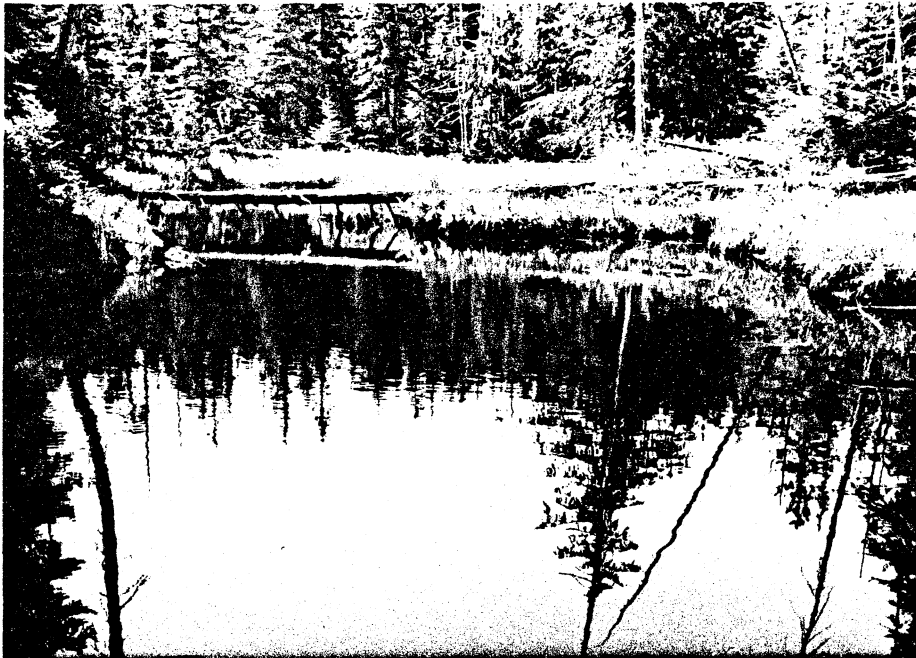


5. A 7 m cascade in Section 5 is a potential barrier to pink and chum salmon. Coho fry were common above the cascade.



6. Section 6: Low gradient and good ASA just above the cascade.

Squaw Creek
106-30-82



7. The stream becomes sinuous and slough-like in Section 9.



8. A small tributary enters Section 10.

Squaw Creek
106-30-82



9. The mouth of Survey Area "B".



10. Survey Area "B": Section 4 is a channelized beaver system which travels through a wide, grassy floodplain, similar to Section 2 & 3.

Squaw Creek
106-30-82



11. Survey Area "B": The stream enters a fringe of trees in Section 5. ASA improves with an increase in gradient and small cobble substrate.



12. Survey Area "B": An abrupt gradient increase occurs as the stream enters a V-notch in Section 6.

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106-30-82



13. The mouth of Survey Area "C" taken from Lake II.



14. Survey Area "C": Section 2 has increased gradient and good ASA, as the stream travels through a transitional zone between floodplain to forest.

Squaw Creek
106-30-82



15. Survey Area "C": The stream enters the forest at Section 3.



16. Survey Area "C": An 8 m barrier falls at the end of Section 3.

Squaw Creek
106-30-82



17. The mouth of Survey Area "D" taken from Lake II.



18. Survey Area "D". Large pools in Section 1 provide excellent rearing habitat.

Squaw Creek
106-30-82

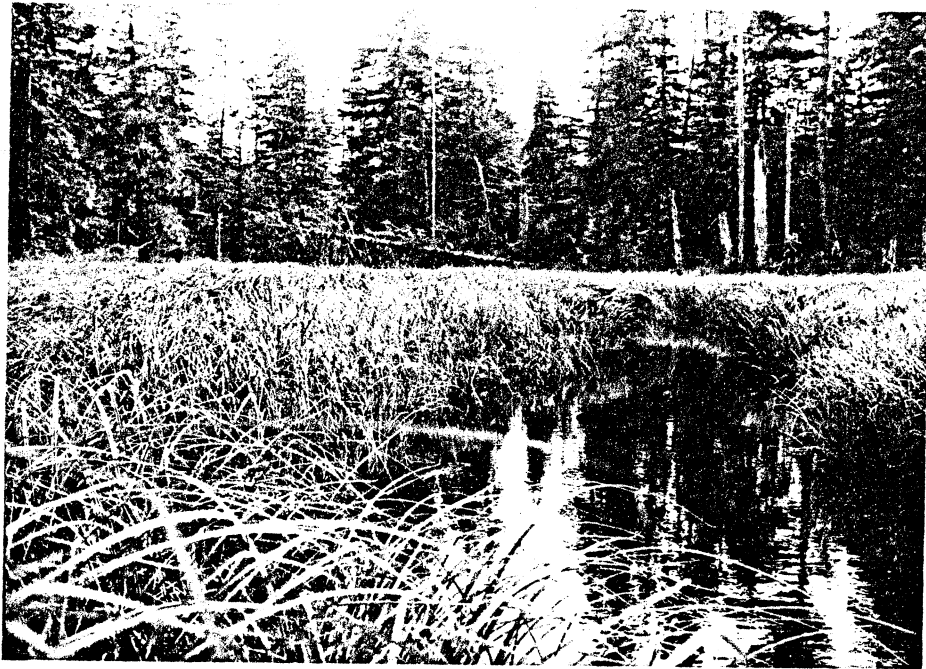


19. The mouth of Survey Area "D-1".



20. Survey Area "D-1": Large cobble substrate in Section 2.

Squaw Creek
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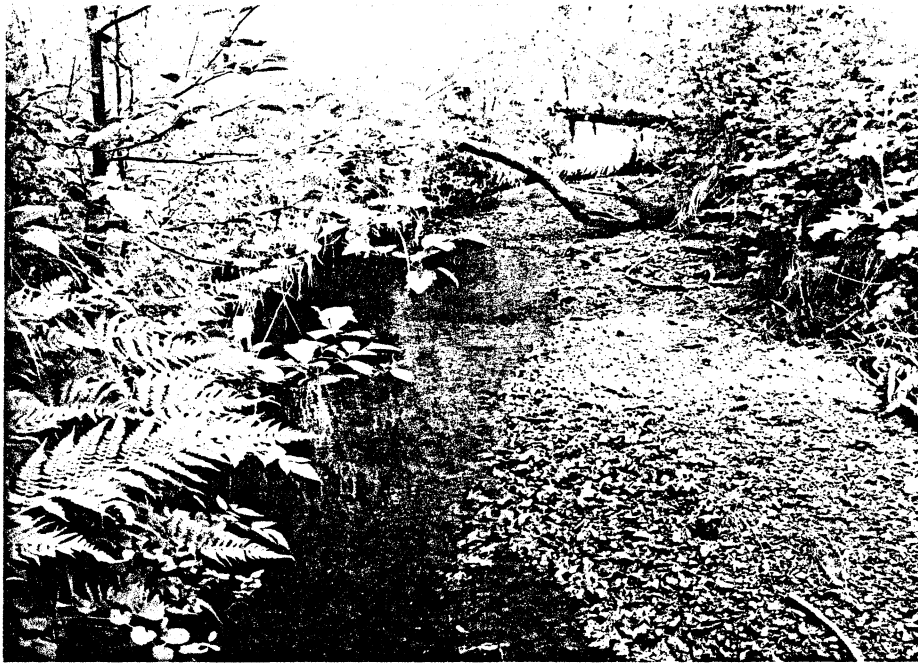


21. The mouth of Survey Area "D-2" taken from Lake III.



22. Survey Area "D-2": Section 1 is sinuous, traveling through a wide, grassy floodplain.

Squaw Creek
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23. Survey Area "D-2": Section 2 contains intermittent regions of gradient providing some ASA.



24. Survey Area "D-2": Section 5 has increased gradient through the forest. Fish habitat diminishes.

Squaw Creek
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25. The mouth of Survey Area "E" taken from Lake II.



26. Survey Area "E". Sharply undercut banks and a good pool/riffle ratio provide good rearing habitat in Section 1.

Squaw Creek
106-30-82



27. Survey Area "F": The mouth of the survey area taken from Lake II.



28. Survey Area "F": This small stream has dense riparian cover.

Squaw Creek
106-30-82

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
Survey Area "A"					Survey Area "D-2"				
1	300	9.3	40	1116	1	300	3.0	1	9
2	200	7.4	30	444	2	200	2.5	5	25
3	300	7.9	35	829.5	3	300	2.6	7	54.6
4	200	3.4	--	--	4	200	1.0	1	2
5	100	5.8	--	--	5	300	1.8	1	5.4
6	200	4.8	15	144	Total	96.0m ²			
7	200	9.2	4	73.6					
8	100	9.0	2	18	Survey Area "E"				
9	200	6.0	--	--	1	300	2.9	3	26.1
10	150	9.0	2	27	2	125	1.9	2	4.8
Total				2652.1m ²	Total	30.9m ²			
Survey Area "B"					Survey Area "F"				
1	115	5.4	3	18.6	1	200	0.4	2	1.6
2	500	3.5	--	--	Total Stream ASA	3115.2m ²			
3	500	6.2	--	--					
4	500	2.0	1	10					
5	200	1.8	20	72					
6	300	2.4	2	14.4					
7	300	3.1	1	9.3					
8	250	1.9	--	--					
Total				124.3m ²					
Survey Area "C"									
1	300	1.5	3	13.5					
2	200	1.8	5	18					
3	250	3.1	3	23.3					
Total				54.8m ²					
Survey Area "D"									
1	300	3.8	5	57					
2	200	2.5	5	25					
3	280	3.2	3	27					
Total				109.0m ²					
Survey Area "D-1"									
1	300	2.0	5	30					
2	200	1.8	2	7.2					
3	300	3.1	1	9.3					
Total				46.5m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82
Survey Area "A"

Reach Number	1	1	1	2	2	3	3
1. Section Number	1	2	3	4	5	6	7
2. Section Length	300	200	300	200	100	200	200
3. Compass Bearing	00	00	330	320	280	040	330
4. Gradient	1.0	1.5	1.0	4.5	6.5	1.0	2.0
5. Water Quality	4	4	4	4	4	4	4
6. Bank Type	B/A	B	B	B	B	B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1,3-5	1,3-5	1-5	1,3,4	1,3,4	1,3,4	1,3,4
9. Debris Loading	3	5	5	4	3	2	3
10. Undercut Bank Length	--	--	--	--	--	--	--
11. Stream Width:							
Channel	9.3	11.4	9.9	4.9	7.6	7.5	9.2
Water	9.3	7.4	7.9	3.4	5.8	4.8	9.2
12. Water Type %:							
SS	20	30	25	15	15	30	35
DS	--	--	--	25	25	5	5
SF	80	70	75	25	25	60	60
DF	--	--	--	35	35	5	--
13. Substrate %:							
Bedrock	--	--	--	15	35	20	25
Boulder	3	5	5	45	30	15	25
Large Cobble	12	15	15	25	25	10	20
Small Cobble	35	35	40	10	10	30	15
Gravel	45	40	35	5	--	20	10
Sand	5	5	5	--	--	5	5
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	40/3	30/3	35/2	--	--	15/2	4/2
15. Rearing Area %	30	35	30	15	10	20	30
16. Pool Cover %	10	15	20	5	--	--	1
17. Riffle Cover %	7	10	10	5	2	4	2
18. Fish Observed	SS	SS	SS			SS	SS
	CT	CT	CT	CT	CT	CT	CT
	DV	DV	DV	DV	DV	DV	DV
19. Sampling	Y	N	N	N	N	N	Y
20. Potential Barriers	N	N	N	2	2	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Shallow and wide channel. ASA is plentiful, but flow is marginal. Forbs are growing in the stream channel.

Section 2: Slight gradient increase. ASA quality improves due to better stream flow.

Section 3: Similar habitat to Section 1. A moderate sized tributary (Survey Area "B") enters the right bank at 250 m.

22. Investigators Randy Ericksen Date 6/23/83

LEVEL TWO HABITAT SURVEY

- Section 4: Abrupt gradient increase. Stream enters a V-notch. Substrate consists mostly of large cobble and boulder. A 2 m falls at the end of the section may be a barrier to pink and chum salmon.
- Section 5: Gradient increases. Bedrock and boulders are the dominant substrate. A 7 m cascade almost certainly is a barrier to pink and chum salmon. Coho fry are found above the falls.
- Section 6: Low gradient. Substrate consists of gravel and small cobble interspersed by bedrock patches.
- Section 7: Substrate shift to larger size.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82
Survey Area "A"

Reach Number	3	4	4				
1. Section Number	8	9	10				
2. Section Length	100	200	150				
3. Compass Bearing	220	350	010				
4. Gradient	1.5	0.5	1.0				
5. Water Quality	4	4	4				
6. Bank Type	B	C	C				
7. Bank Stability	1/1	1/1	1/1				
8. Bank Vegetation	1,3,4	1,5	1,3-5				
9. Debris Loading	2	3	2				
10. Undercut Bank Length	70	80	--				
11. Stream Width:							
Channel	9.0	6.6	9.0				
Water	9.0	6.0	9.0				
12. Water Type %: SS	40	40	40				
DS	--	60	--				
SF	60	--	60				
DF	--	--	--				
13. Substrate %:							
Bedrock	35	15	35				
Boulder	35	5	35				
Large Cobble	20	20	20				
Small Cobble	10	10	10				
Gravel	--	10	--				
Sand	--	--	--				
Muck	--	40	--				
Other	--	--	--				
14. ASA %/Quality	2/2	--	2/2				
15. Rearing Area %	40	90	20				
16. Pool Cover %	3	3	3				
17. Riffle Cover %	30	--	10				
18. Fish Observed	CT	CT	CT				
	DV	DV	DV				
	SS	SB	SB				
19. Sampling	N	N	N				
20. Potential Barriers	N	N	N				
21. Enhancement/Rehab	N	N	N				

Section 8: An overhanging rock ledge covers 40 m of stream.

Section 9: Stream becomes sinuous and slough-like. Low gradient.

Section 10: Increase in stream velocity. Large cobble, boulders and bedrock are dominant substrate. A small (1 cfs) tributary enters the left bank at the end of the section. This drains a muskeg and contains about 50 m of rearing habitat. Survey Area "A" terminates at Lake I (see map).

22. Investigators Randy Ericksen Date 6/23/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82
Survey Area "B"

Reach Number	1	1	1	1	2	3	3
1. Section Number	1	2	3	4	5	6	7
2. Section Length	115	500	500	500	200	300	300
3. Compass Bearing	00	00	00	030	100	060	030
4. Gradient	1.0	0.5	0.5	0.5	1.5	5.0	6.0
5. Water Quality	4	4	4	4	4	4	4
6. Bank Type	B	A	A	A	B	B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	3/3
8. Bank Vegetation	1,3-5	1,2,5	1,5	1-5	1-5	1-4	1-4
9. Debris Loading	40	2	2	2	10	10	40
10. Undercut Bank Length	20	900	500	400	50	--	--
11. Stream Width:							
Channel	5.4	3.5	6.2	2.0	2.2	5.5	4.6
Water	5.4	3.5	6.2	2.0	1.8	2.4	3.1
12. Water Type %: SS	65	35	30	30	30	25	35
DS	--	65	65	60	5	--	--
SF	35	--	--	10	65	75	65
DF	--	--	5	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	5	10
Boulder	2	--	--	--	--	5	25
Large Cobble	8	--	--	--	5	15	20
Small Cobble	50	5	--	5	60	50	25
Gravel	20	5	5	15	23	20	15
Sand	5	10	10	10	10	5	5
Muck	15	70	85	70	--	--	--
Other	--	10/C	--	--	2/C	--	--
14. ASA %/Quality	3/1	--	--	1/2	20/2	2/2	1/2
15. Rearing Area %	90	100	100	90	30	10	5
16. Pool Cover %	40	2	2	2	30	10	30
17. Riffle Cover %	15	--	5	5	5	10	20
18. Fish Observed	SB	SB	SB	SB	SB		
	CT	CT	CT	CT	CT	CT	CT
	DV	DV	DV	DV	DV	DV	
	SS	SS	SS	SS	SS		
19. Sampling	Y	N	Y	N	N	N	N
20. Potential Barriers	N	N	N	N	N	2	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Begins 250 m up Section 3 of Survey Area "A". Heavy debris loading. Stream channel is shallow and wide with skunk cabbage growing in midstream.

Section 2 & 3: Beaver system. Stream travels through a wide floodplain with grassy banks. Good rearing but no ASA.

Section 4: Continue beaver/slough habitat with occasional regions with gradient and ASA.

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LEVEL TWO HABITAT SURVEY

- Section 5: Slight gradient increase. Stream channel becomes more defined. Good ASA. Banks are forested.
- Section 6: Abrupt gradient increase. Stream enters old growth forest and V-notch. A 1.5 m falls may be a barrier to pink and chum salmon at 190 m.
- Section 7: Continue steep gradient through a V-notch. A landslide and massive blowdown have occurred starting at 80 m.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82
 Survey Area "B"

Reach Number	3						
1. Section Number	8						
2. Section Length	250						
3. Compass Bearing	070						
4. Gradient	6.5						
5. Water Quality	4						
6. Bank Type	B						
7. Bank Stability	1/1						
8. Bank Vegetation	1-4						
9. Debris Loading	30						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	3.8						
Water	1.9						
12. Water Type %:							
SS	25						
DS	--						
SF	75						
DF	--						
13. Substrate %:							
Bedrock	10						
Boulder	30						
Large Cobble	30						
Small Cobble	20						
Gravel	10						
Sand	--						
Muck	--						
Other	--						
14. ASA %/Quality	--						
15. Rearing Area %	5						
16. Pool Cover %	30						
17. Riffle Cover %	10						
18. Fish Observed	CT						
19. Sampling	N						
20. Potential Barriers	N						
21. Enhancement/Rehab	N						

Section 8: U.S.F.S. has laid out a proposed logging unit along the right bank.
 Survey Area "B" terminates at road crossing.

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LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82

Survey Area "C"

Survey Area "D"

Reach Number	1	1	1		1	1	1
1. Section Number	1	2	3		1	2	3
2. Section Length	300	200	250		300	200	280
3. Compass Bearing	210	280	230		320	270	210
4. Gradient	1.0	1.5	6.0		1.0	1.5	1.5
5. Water Quality	3	3	3		3	3	3
6. Bank Type	A	C	B		B	B	B/C
7. Bank Stability	1/1	1/1	1/1		1/1	1/1	1/1
8. Bank Vegetation	1,2,5	1,2,5	1,3,4		1-5	1-5	1-5
9. Debris Loading	1	1	5		4	5	10
10. Undercut Bank Length	150	60	--		230	130	160
11. Stream Width:							
Channel	2.0	2.9	4.9		3.9	3.3	3.2
Water	1.5	1.8	3.1		3.8	2.5	3.2
12. Water Type %: SS	60	50	40		40	40	40
DS	10	20	--		20	5	5
SF	30	30	60		40	55	55
DF	--	--	--		--	--	--
13. Substrate %:							
Bedrock	--	5	25		--	--	5
Boulder	--	--	5		--	5	5
Large Cobble	--	5	25		10	20	25
Small Cobble	40	30	25		50	50	45
Gravel	10	10	20		15	25	20
Sand	10	10	--		5	--	--
Muck	40	40	--		20	--	--
Other	--	--	--		--	--	--
14. ASA %/Quality	3/2	5/2	3/2		5/2	5/2	3/2
15. Rearing Area %	80	60	5		70	70	80
16. Pool Cover %	1	--	5		4	5	5
17. Riffle Cover %	5	10	4		10	10	10
18. Fish Observed	DV	DV	DV		DV	DV	DV
	CT	CT	CT		CT	CT	CT
	SS	SS			SS	SS	SS
	SB	SB			SB		
19. Sampling	N	Y	N		N	Y	N
20. Potential Barriers	N	N	2		N	N	N
21. Enhancement/Rehab	N	N	N		N	N	N

Survey Area "C":

Section 1: Begins at south end of Lake II (see map). Low gradient through a wide grassy floodplain. Coho fry were abundant.

Section 2: Slight gradient increase. Continues through grassy area with occasional alder and scrubby pine.

Section 3: Gradient becomes moderate/steep. Stream enters forest. 125m; 30 m area of bedrock cascade. Probably not a barrier to coho salmon.

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LEVEL TWO HABITAT SURVEY

Survey Area "C":

Section 3: 250m; 8 m barrier falls termination of Survey Area "C".

Survey Area "D":

Section 1: Begins at southeast end of Lake II (see map). Grassy near lake but soon enters forest. One large (about 230 mm) trout was seen near the lake, and coho fry were abundant. Excellent rearing habitat.

Section 2: Slight gradient increase. Fry were common. A moderately sized tributary (Survey Area "D-1") enters the right bank.

Section 3: Stream flows through a road culvert at 200 m. A marker near the road says "Stream Culvert Survey #1 6-31-81 J. Kluthe". The stream hits a beaver dam at Lake III (see map), the terminus of Survey Area "D".

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82

Survey Area "D-1"

Survey Area "D-2"

Reach Number	1	1	1		1	2	2
1. Section Number	1	2	3		1	2	3
2. Section Length	300	200	300		300	200	300
3. Compass Bearing	240	300	340		230	270	170
4. Gradient	1.5	3.0	5.5		0.5	1.0	1.5
5. Water Quality	3	3	3		3	3	3
6. Bank Type	B	B	B		A	A	C/B
7. Bank Stability	1/1	1/1	1/1		1/1	1/1	1/1
8. Bank Vegetation	1-5	1-5	1,3-5		1-5	1-5	1-5
9. Debris Loading	15	20	5		2	5	10
10. Undercut Bank Length	100	20	--		270	200	100
11. Stream Width:							
Channel	3.1	2.8	1.8		3.5	2.5	2.6
Water	2.0	1.8	3.1		3.0	2.5	2.6
12. Water Type %: SS	60	40	40		10	60	50
DS	--	--	--		80	10	5
SF	40	60	60		10	30	45
DF	--	--	--		--	--	--
13. Substrate %:							
Bedrock	--	--	--		--	--	5
Boulder	5	15	30		--	--	--
Large Cobble	20	30	30		--	--	5
Small Cobble	40	20	20		--	40	30
Gravel	20	20	10		5	30	30
Sand	15	10	10		40	10	10
Muck	--	5	--		55	20	20
Other	--	--	--		--	--	--
14. ASA %/Quality	5/2	2/2	1/2		1/2	5/2	7/2
15. Rearing Area %	60	20	--		90	70	70
16. Pool Cover %	20	20	10		2	5	10
17. Riffle Cover %	10	15	5		10	10	10
18. Fish Observed	DV	DV	DV		DV	DV	DV
	CT	CT	CT		CT	CT	CT
	SS	SS			SS	SS	SS
					SB		
19. Sampling	N	N	N		N	N	N
20. Potential Barriers	N	N	N		N	N	N
21. Enhancement/Rehab	N	N	N		N	N	N

Survey Area "D-1":

Section 1: Begins at Section 2 of Survey Area "D". Low gradient; good rearing habitat. The stream flows through a road culvert at 210 m. Coho fry common.

Section 2: Moderate gradient.

Section 3: Gradient becomes increasingly steep. Fish habitat is poor. Survey terminated due to lack of fish habitat.

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LEVEL TWO HABITAT SURVEY

Survey Area "D-2":

Section 1: Begins at the south end of Lake III (see map). Stream winds through grassy floodplain.

Section 2: Begin occasional regions of gradient. Coho fry common.

Section 3: Low-moderate gradient. Good ASA and excellent rearing habitat.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Squaw Creek 2. ADF&G Catalog No. 106-30-82

Survey Areas

"D-2"

"E"

"F"

Reach Number	2	3		1	1		1
1. Section Number	4	5		1	2		1
2. Section Length	200	300		300	125		200
3. Compass Bearing	200	230		330	030		070
4. Gradient	1.5	4.0		1.0	1.0		5.0
5. Water Quality	3	3		3	3		4
6. Bank Type	B	B		C	B/C		B
7. Bank Stability	1/1	1/1		1/1	1/1		1/1
8. Bank Vegetation	1-5	1-5		1-5	1-5		1-4
9. Debris Loading	10	10		5	5		20
10. Undercut Bank Length	100	20		100	30		30
11. Stream Width:							
Channel	3.5	2.0		2.9	1.9		0.4
Water	1.0	1.8		2.9	1.9		0.4
12. Water Type %: SS	60	40		70	60		80
DS	--	--		5	5		--
SF	40	60		25	35		20
DF	--	--		--	--		--
13. Substrate %:							
Bedrock	--	5		--	--		25
Boulder	--	5		--	--		--
Large Cobble	--	20		2	--		5
Small Cobble	10	30		8	15		10
Gravel	10	20		20	20		10
Sand	30	10		60	60		20
Muck	50	10		10	5		30
Other	--	--		--	--		--
14. ASA %/Quality	1/2	1/1		3/3	2/3		2/2
15. Rearing Area %	90	40		90	70		90
16. Pool Cover %	20	10		4	10		10
17. Riffle Cover %	70	20		60	40		100
18. Fish Observed	CT	CT		CT	CT		CT
	DV	DV		DV	DV		
				SS	SS		SS
19. Sampling	N	N		N	N		N
20. Potential Barriers	N	N		N	N		2/4
21. Enhancement/Rehab	N	N		N	N		N

Survey Area "D-2":

Section 4: Stream enters forest and old deteriorated beaver system.

Section 5: Increased gradient & substrate size. Fish habitat is minimal.

Survey terminated due to lack of fish habitat.

Comments Continued Next Page

22. Investigators Randy Ericksen Date 6/24/83

LEVEL TWO HABITAT SURVEY

Survey Area "E":

Section 1: Begins at northwest end of Lake II. Enters forest immediately. Sharply undercut banks. Good rearing habitat. Coho fry are common.

Section 2: Stream travels through a road culvert between two spur roads at 65 m, then stream forks into two seeps with no fish habitat. Stream runs parallel to logging road. Survey terminated.

Survey Area "F":

Section 1: Begins at northeast end of Lake II. Stream is small with steep gradient. Several small falls probably prevent migration of adult salmon. The stream ends at a large, old beaver dam at the southeast end of Lake IV (see map).

FISH SAMPLING FORM

Stream Name Squaw Creek ADF&G Catalog No. 106-30-82 Date 6/23&24/83

Identify Survey Area A,B,C,D Water Temp. 15-18.5°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1115	1945	--		Survey Area "A" Section 1
2	1310	1045 (next day)	CT - 1		Section 7 Survey Area "C"
3	1450	1550	CT - 1 SB - 1 SS - 1		Section 2
4	1615	1635	--		Survey Area "D" Section 2
5	1015	1110	SB - 5 SS - 2		Survey Area "B" Section 1
6	1025	1150	SB - 4 DV - 1 SS - 1 Salamander	1	Section 2

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

Squaw Creek
106-30-82

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
1966	35,000	400		
1968	3,000			
1970	20,000			
1971	2,123			
1972	5,003			
1974	700	5		
1975	2,160	40		
1976	600			
1977	4,600			
1978	5,203			
1979	200			
1982	2,070			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A, B, C 2. Section Length 100 meters
3. Historical Fish Species PS, SS, CS, ST, CT

Part II.

1. Stream Name 108 Creek 2. ADF&G Catalog No. 106-30-080
3. Latitude 56°07'45" Longitude 133°08'35"
4. Agency Unit 05 5. Mgmt. Area 538K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 23 Photos 24-30/Fl. Ln. 22 Photos 134-138/
8. Bay/Drainage Whale Pass 9. Access 1
10. Present Land Use Logging camp at mouth; active logging roads.
11. Historical Land Use Watershed roaded, studied, logged in the mid 60's.
12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow about 45 cfs 14. Flow Stage 2
15. Stream Temperature 14°-20° 16. pH 7.7-8.0 17. Beaver
18. Temperature Sensitivity Yes, southern exposure with extensive harvest of watershed.
19. Barrier Yes, Survey Area A; Section 31: 50m 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 65 % Gravel/S. Cob. 30 %
L. Cob/Boulder/Bedrock 5 %
B. Gradient 1 %
C. ASA % Excellent
D. Schooling Middle area ITZ/high tide/and bay
E. Shellfish Yes, abundant clam and Dungeness sign
F. Anchorage Off Whale Pass camp; large mud flat near stream

22. Comments

Stream Evaluation

Background

108 Creek (otherwise known as Big Creek or Cavern Creek) is located in the northwest corner of Whale Pass in close proximity to Whale Pass logging camp. Designated as a study area for the effects of logging and leave strips on salmonid populations and stream hydrology, 108 Creek watershed was soil mapped and hydrologically analyzed. An ADF&G fish weir was in operation in the 60's until 1971. A USGS gaging station is also present.

Road construction began in 1964 with roading in close proximity to the ITZ and crossing the ITZ. The bridge site was moved from crossing in a highly productive area of the ITZ to its present location. Logging began in 1966 in

23. Investigators Gerry Merrigan 24. Date 6/22/83

LEVEL TWO HABITAT SURVEY
108 Creek
106-30-080

Background Cont.

the Reach V area, and by 1968 the upper leave strips and the majority of the upper watershed was cut. Windthrow salvage and stream clearing was conducted in Reach II and the lower portion of Reach III. Only the upper portion of Reach III and Reach IV (V-notch) were not logged. The majority of the 7,067 acre watershed has been harvested. The study was inconclusive as to the usefulness of leave strips, since the buffer areas set aside were of insufficient width. This and the combination of southern exposure to a straight shot up Whale Pass (a narrow, glaciated valley), and prevailing southeast winds, explains heavy windthrow in the experimental plots. The plots were then logged off and the studies essentially abandoned.

The ITZ is not very impacted from all of this, with the exception of some refuse strewn throughout the tide flat. This upper ITZ has excellent spawning areas above the bridge, reportedly heavily used by pinks and chums. Reach II has little significant habitat, but Reach III is very productive along with a few tributaries. Reach IV is a V-notch with little habitat. Reach V lies within a unit and has a water temperature of 20°C and a resulting heavy layer of aquatic vegetation on the substrate. It is believed that all cold water fish cease growth above 20.3°C because of increased metabolic activity. The upper lethal temperature for kings, cohos, reds, and pinks is approximately around 25°C depending on other environmental factors. Reach VI has also been entirely logged off. The survey ends at a falls which appears to be a barrier for all fish though apparently coho get by since coho adults and fry have been reported in the second lake (Twin Island Lake). The first lake is Bound Lake (or Cavern Lake) whose outlet flows under a limestone dike and emerges from a cavern above the falls.

The stream system is a producer of pinks, chums, coho, cutthroat, steelhead, rainbow and Dolly Varden trout. A fishway around the falls would give sockeye and increased numbers of coho access to the lakes. However, the inlet streams to the lakes appear to be very steep with minimal ASA. Spawning would be limited to lake shores and the interconnecting stream between the two lakes. Considering the fact that the watershed is already highly impacted by logging, there does not seem to be sufficient enough gain in ASA to warrant enhancement.

Reach Analysis

ITZ

The lower ITZ is primarily a large mud flat with heavy fines in the cobble substrate of the stream channel. Large populations of mussels and clams were observed here, as well as considerable amounts of aquatic vegetation (rockweed, Ulva spp., etc).

The middle ITZ is located in the grass meadow area below the bridge crossing. Heavy fines still predominate in the substrate but gravel composition gradually increases with ASA going from poor to good just below the bridge. Most IT rearing pools and sloughs are located in the middle ITZ.

LEVEL TWO HABITAT SURVEY
108 Creek
106-30-080

ITZ Cont.

The upper ITZ has excellent gravel riffles which seemed significant enough to warrant sectional survey (Reach I). This 400 meter stretch is excellent pink and chum spawning area with shallow riffle over loose gravel. Large amounts of coho fry were observed in this area. The bridge crossing is a bi-span log stringer bridge with a footing on an island. The aborted first bridge crossing is located at Section 2I: 65m. The old ADF&G weir site is located at Section 4I: 100m. After this point the stream channel narrows and the ITZ ends.

Reach II: 300m

As the stream channel width narrows, the velocity and gradient noticeably increase. The substrate changes to bedrock/boulder/cobble with no ASA. A 2 meter cascade over bedrock occurs 200 meters from the mouth of the stream, but does not constitute a barrier. Blowdown logs have apparently been removed from the channel in stream cleanup operations. Above the cascade, the USGS gaging station and cable car are located. Few coho and trout fry were observed in this Reach.

Reach III: 700m

The stream channel widens as gradient and velocity decrease. Substrate size diminishes to cobble/gravel with heavy sand deposition. Best ASA is located on gravel areas flanking the cobble main channel. Two significant tributaries enter in this Reach; Survey Area "B", Section 4: 55m, and Survey Area "C", Section 9: 50m. Both streams have good ASA with overhanging streambank vegetation. Again the stream narrows and substrate size increases. Heavy concentrations of coho and trout fry were observed, especially behind numerous instream logs.

Reach IV: 800m

This reach is characterized by high velocity flow over boulder/cobble substrate between steep banks with little fish habitat. Small populations of trout fry were observed and very few coho fry. Areas of blowdown with associated soil slumps are scattered through the Reach.

Reach V: 600m

At Section 19: 0m, the stream characteristics change sharply. The stream channel becomes wide and shallow as the gradient and velocity decrease. The substrate is predominantly gravel with little instream debris. The entire Reach is within an old unit, completely cut to the banks with no canopy of streamside cover whatsoever. A continuous sheet of "slime" covers the substrate. The water temperature jumps up to 20°C (68°F). Large concentrations of coho and trout fry were observed in this temperature sensitive area. Isolated soil slumps are located within the unit.

LEVEL TWO HABITAT SURVEY
108 Creek
106-30-080

Reach VI: 650m

Again, the velocity and gradient increase as the channel width decreases. The substrate varies from boulder to cobble along with stretches of bedrock. Water temperature is reduced (16°C) though still warm. The Reach is entirely within an old unit with no canopy coverage. An old road crossing (bridge pulled) is located at Section 25: 100m. Rearing cover is moderate and ASA is scattered with moderate trout fry and little coho fry. A staircase succession of cascades/falls totalling 30 meters in height is located at Section 31: 50m. Another 40 meters upstream of the falls, the stream enters a limestone cavern and continues for 20 meters until the cavern roof slopes downward to meet the stream surface. Water temperature is 14°C. No fish were observed above the falls, though it is reported that coho fry have been found in the second lake of the system. End of survey.

Survey Area "B"

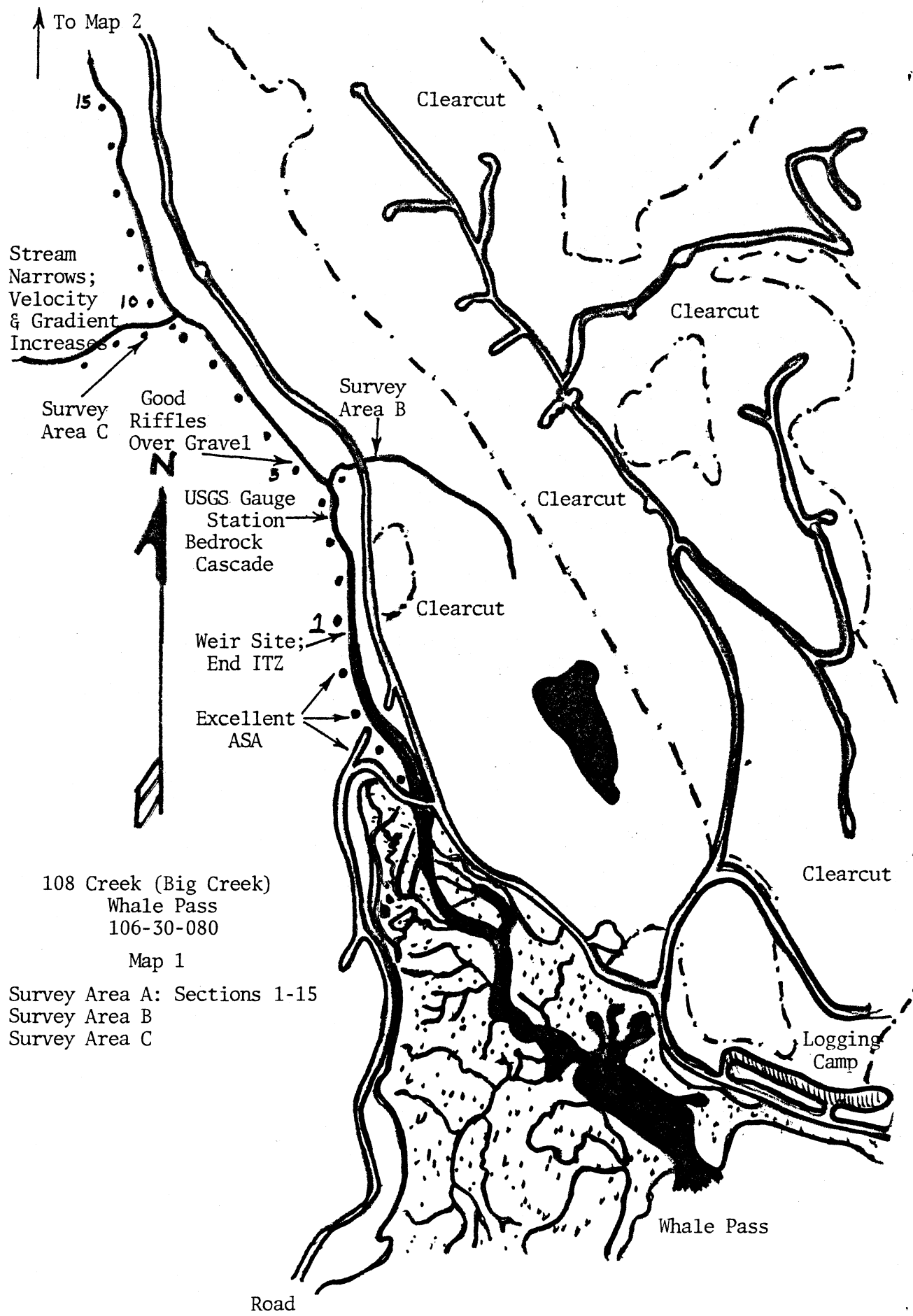
100m Tributary Entering Main Stem at Section 4: 55m; Right Side

This is an excellent spawning and rearing stream for 60 meters with salmonberry cover over loose gravel. At 60 meters the gradient sharply increases. A road crossing with a log culvert is at 100m of the survey. After this point, the stream races up the hillside over cobble substrate. Heavy concentrations of coho and DV fry are in the lower portion of the stream.

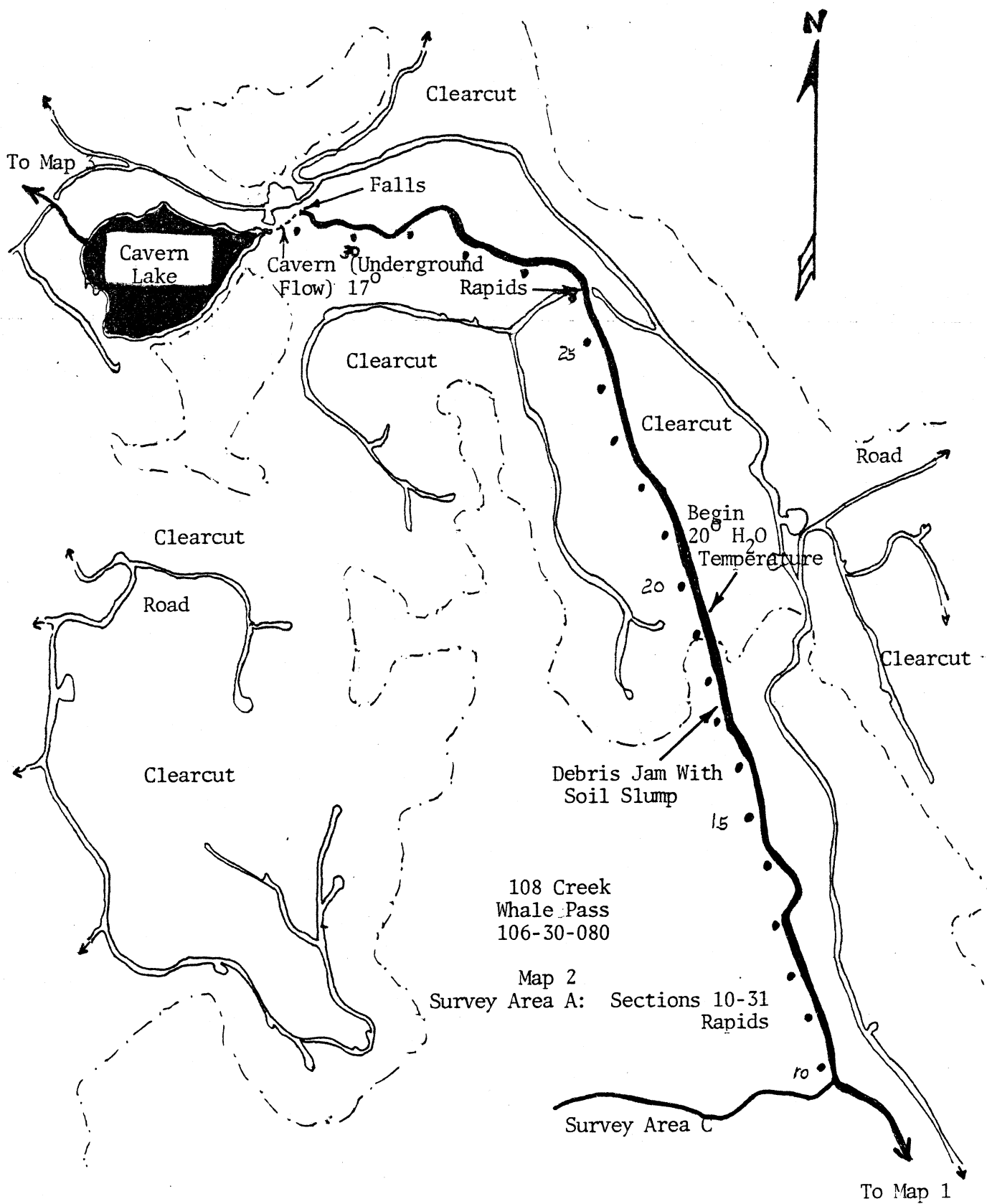
Survey Area "C"

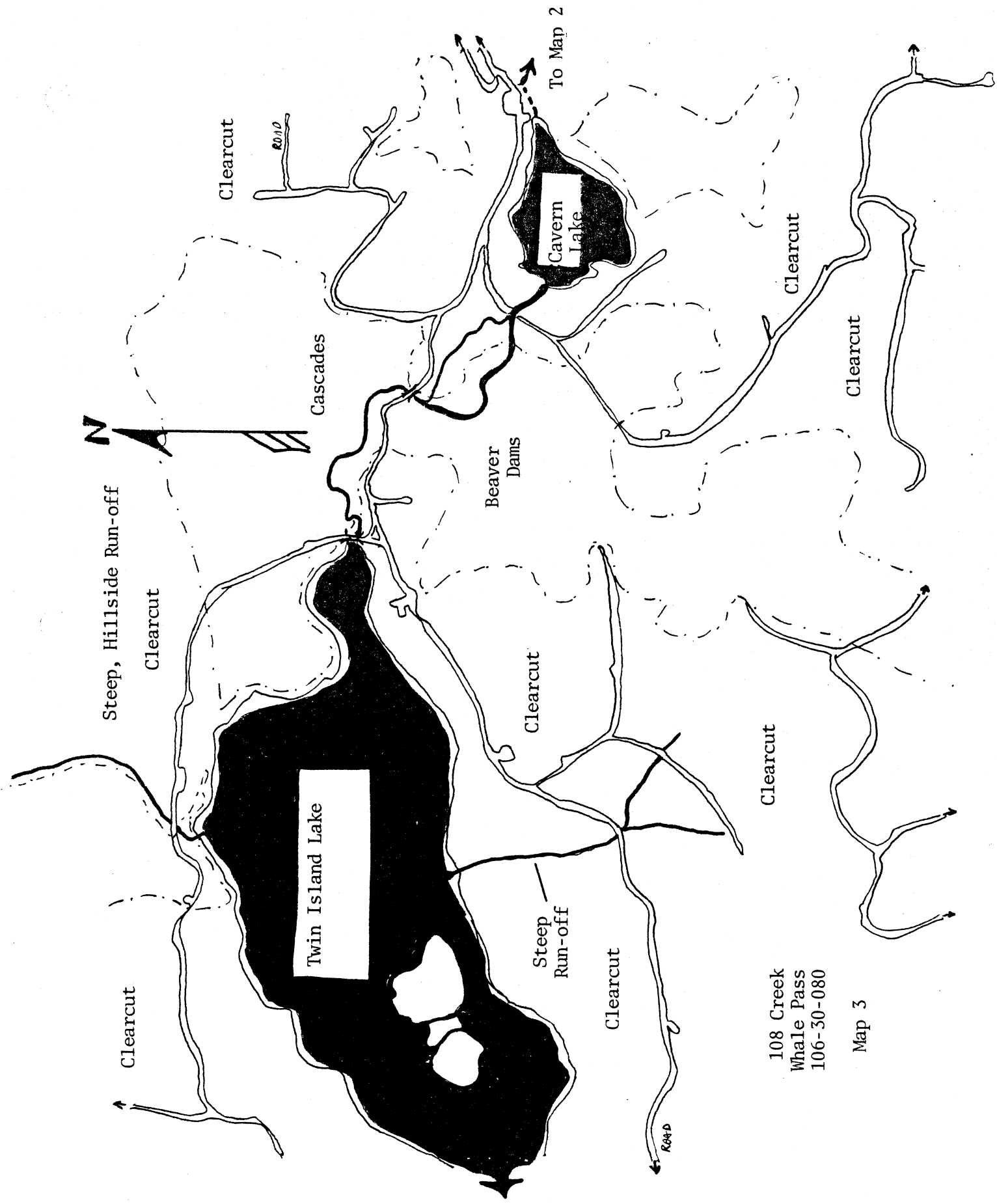
450m Tributary Entering Main Stem at Section 9: 50m; Left Side, Left Channel

This tributary also has good loose gravel with almost complete salmonberry cover. Flowing through a spruce flat, the stream has good ASA, rearing, and heavy concentrations of coho fry. After 390m, the gradient starts to increase and by 450m, no fish were observed.



108 Creek (Big Creek)
 Whale Pass
 106-30-080
 Map 1
 Survey Area A: Sections 1-15
 Survey Area B
 Survey Area C





108 Creek
Whale Pass
106-30-080

Map 3

108 Creek
106-30-080



1. Lower ITZ at low tide.



2. Middle ITZ in grass meadow with heavy concentration of fines. Adjacent road visible (middle right of photo).

108 Creek
106-30-080



3. Downstream view of ITZ with Whale Pass logging camp in background.

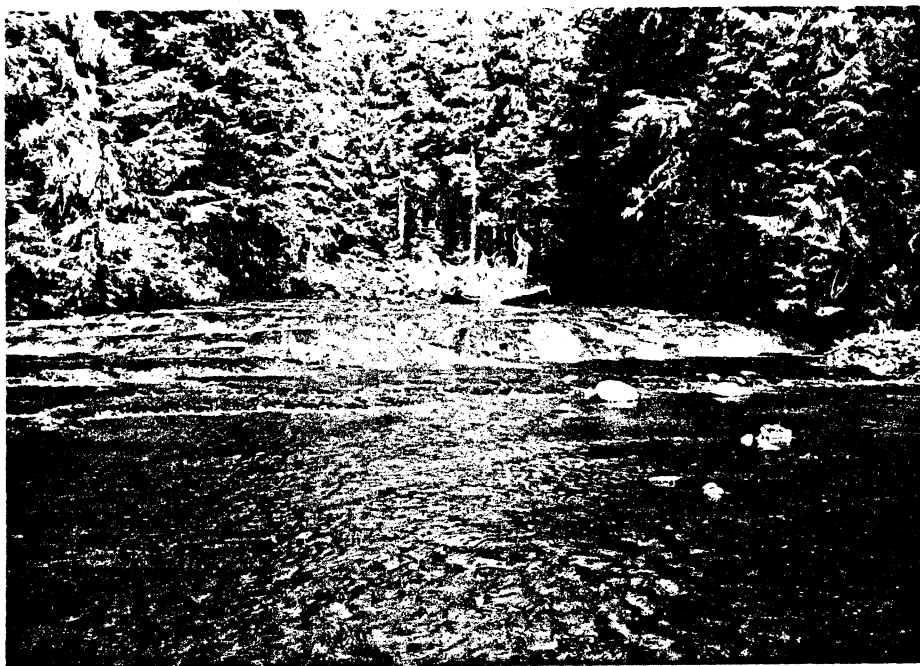


4. Upper ITZ with good spawning riffle; log stringer bridge crossing.

108 Creek
106-30-080



5. Excellent spawning riffle in ITZ above bridge crossing.



6. Reach 2: Section 3: 0m; 2 meter cascade over bedrock at 10% slope.

108 Creek
106-30-080

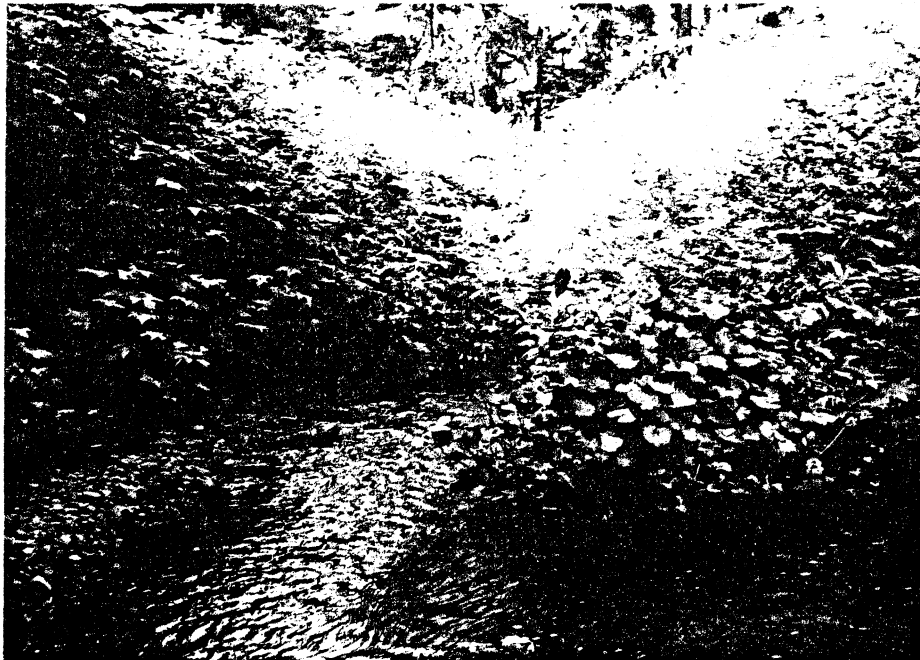


7. Reach 3: Section 4: 20m; Excellent ASA in gravel riffle.



8. Mouth of Survey Area "B"; tributary entering main stem at Section 4: 55m.

108 Creek
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9. Mouth of Survey Area "C"; tributary entering main stem at Section 9: 50m.

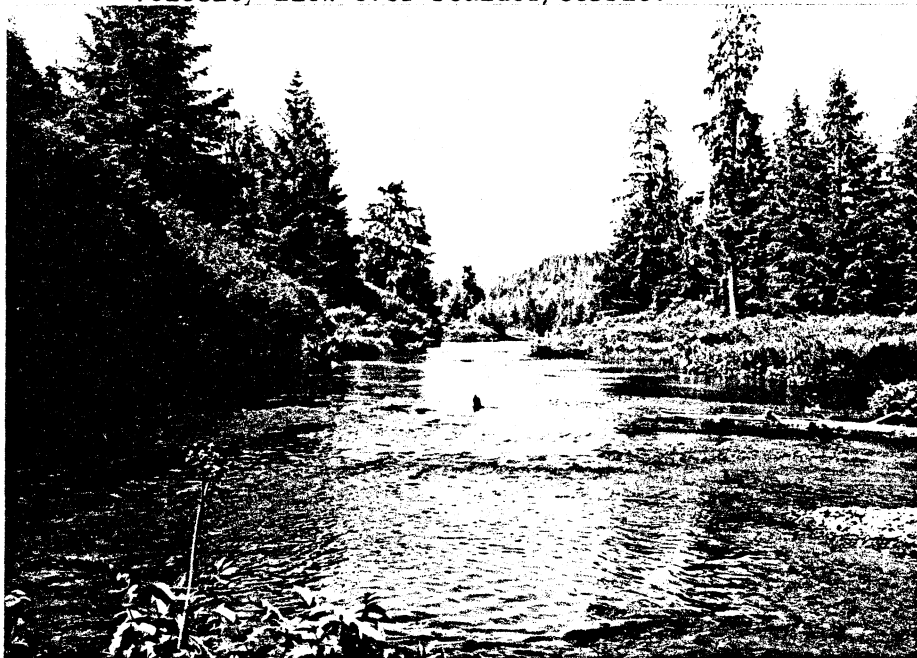


10. Section 2: 0m; Survey Area "C"; gravel riffle with salmonberry cover.

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11. Reach 4: Section 16: 0m; Channelized, high velocity flow over boulder/cobble.



12. Reach 5: Section 19: 0m; Wide shallow flow over gravel wholly within unit with no canopy cover. Water temperature; 10°C.

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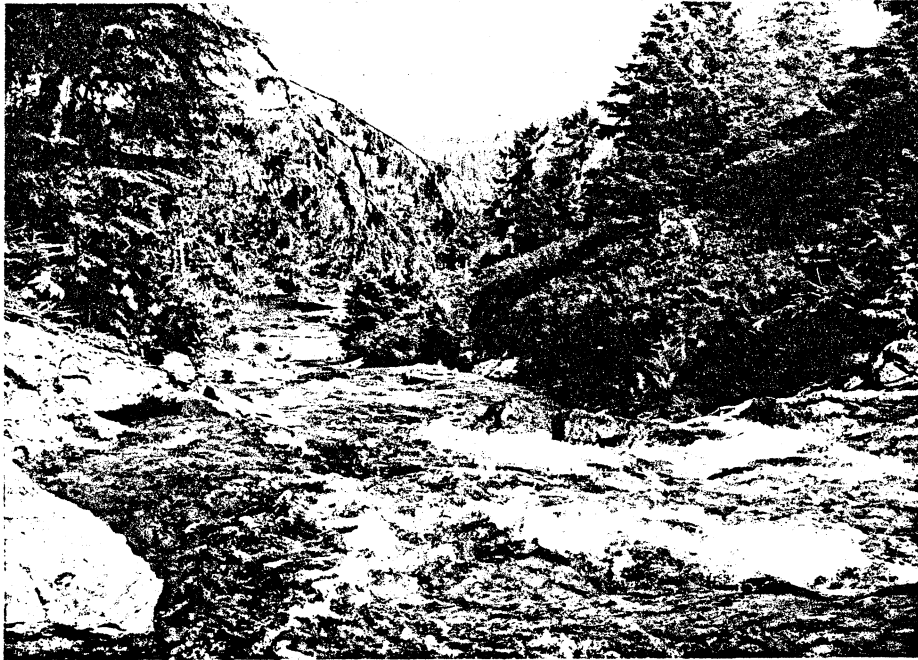


13. Reach 6: Section 26: 30m; Stream flow over boulder/cobble within unit.

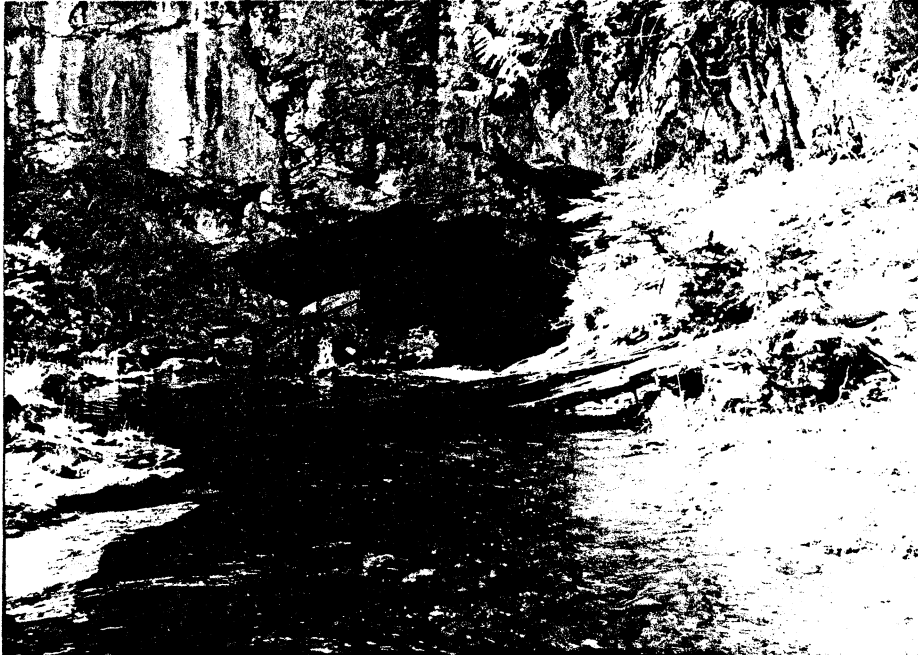


14. Reach 6: Section 31: 50m; Staircase succession of cascade/falls 30 meters in total height over bedrock.

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15. Downstream view from falls at Section 31: 50m;
with large drop evident. Units present on both
banks.



16. Stream emerging from mouth of limestone
cavern located above falls at Section 31:
50m.

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17. Downstream view from cavern of emerging stream.

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Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
Survey Area "A"					21	100	16.0	20	320
<u>ITZ</u>					22	100	18.0	15	270
1I	100	26.0	60	1560	23	100	21.0	15	315
2I	100	28.5	22	627	24	100	18.0	15	270
3I	100	20.0	28	560	25	100	18.0	15	270
4I	100	20.0	35	700	26	100	10.0	20	200
<u>Main Stem</u>					27	100	13.5	12	162
1	100	21.0	--	--	28	100	30.0	10	300
2	100	9.0	8	72	29	100	22.0	5	110
3	100	26.0	10	260	30	100	24.0	5	120
4	100	10.5	30	315	31	50	18.0	--	--
5	100	21.0	40	840	Total				9943.5m ²
6	100	16.0	20	320	Survey Area "B"				
7	100	11.5	25	287.5	1	100	2.2	20	44
8	100	11.5	20	230	Survey Area "C"				
9	100	15.5	10	155	1	100	3.0	35	105
10	100	18.0	10	180	2	100	2.5	22	55
11	100	19.5	--	--	3	100	2.1	18	37.8
12	100	10.0	5	50	4	50	2.2	--	--
13	100	15.0	--	--	Total				197.8m ²
14	100	13.0	--	--	Total of A, B, and C				
15	100	11.0	--	--					10,185.3m ²
16	100	10.0	--	--					
17	100	16.0	5	80					
18	100	15.0	10	150					
19	100	25.5	30	765					
20	100	13.0	35	455					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek

2. ADF&G Catalog No. 106-30-080

Survey Area "A": Main Stem

Reach Number	1	1	1	1	2	2	2
1. Section Number	1I	2I	3I	4I	1	2	3
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	355	325	345	355	00	00	330
4. Gradient	1	1	1	1	2	2.5	4
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1(1,2)	1(2,1)	1(2)	1(2)	1(2)	1(2)	1(2,3)
8. Bank Vegetation	1,3-5	1-5	1-5	1-5	1,3-5	1-5	1-5
9. Debris Loading	1	1	2	1	1	1	3
10. Undercut Bank Length	--	--	--	6	--	25	40
11. Stream Width:							
Channel	41	28.5	20	20.9	22	9	26
Water	*	28.5	20	20	21	9	26
12. Water Type %: SS	30	35	30	35	15	25	25
DS	--	20	25	--	5	15	10
SF	70	45	45	65	80	60	65
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	10	20	40
Boulder	2	5	2	10	20	20	15
Large Cobble	13	15	13	10	30	20	20
Small Cobble	20	30	20	30	20	20	15
Gravel	55	30	55	30	10	20	10
Sand	20	20	20	20	10	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	60/2	22/2	28/2	35/2	--	8/2	10/3
15. Rearing Area %	20	40	50	30	20	20	25
16. Pool Cover %	--	2	20	2	3	25	15
17. Riffle Cover %	1	1	3	5	15	5	5
18. Fish Observed (fry)	DV	DV		DV	DV	DV	DV
(fry)	CO	CO		CO			
(fry)		SS	SS	SS	SS	SS	SS
19. Sampling	N	N	N	N	Y	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1I: 0m; Begin ITZ reach at bridge, road right side. Predominantly riffle over small cobble/gravel with moderate amount of fines and aquatic slime.

Section 2I: 65m; Large blowdown across stream.

Section 4I: 10m survey line cut left side.

100m; Remnant of fish weir site. End ITZ.

* 12.0/14.0

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LEVEL TWO HABITAT SURVEY

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- Section 1: 0m; Begin stream flow above ITZ. End grass meadow and begin channelized (10m) stream over moss covered boulder/cobble with increasing gradient.
- Section 2: 100m; Stream doglegs to left.
- Section 3: 0m; Begin bedrock 2 meter gradual cascade with jumping pool. Logs have been removed from stream. Road and harvested area to right side with open canopy overhead.
50m; End cascade. Begin cobble/gravel substrate.
60m; U.S.G.S. gage station cable car crossing.
75m; Gaging station, right bank. Good riffle with bedrock wall, right side for 35 meters.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek 2. ADF&G Catalog No. 106-30-080

Survey Area "A": Main Stem

Reach Number	3	3	3	3	3	3	3
1. Section Number	4	5	6	7	8	9	10
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	330	325	335	340	305	325	345
4. Gradient	1.5	1.5	1.5	2	2	2	2.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B/A	B	B	B	B/A	B	B
7. Bank Stability	1(1)	1(1)	1(2)	1(2)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	4	3	7	11	7	8	4
10. Undercut Bank Length	130	100	65	60	120	140	120
11. Stream Width:							
Channel	13	21	16	11.5	11.5	15.5	18
Water	10.5	21	16	11.5	11.5	15.5	18
12. Water Type %: SS	30	20	20	30	30	20	25
DS	10	10	10	20	20	15	15
SF	60	70	70	50	50	65	50
DF	--	--	--	--	--	--	10
13. Substrate %:							
Bedrock	5	--	--	--	--	--	--
Boulder	5	10	15	10	10	15	20
Large Cobble	25	30	35	20	20	30	15
Small Cobble	20	30	25	35	35	35	35
Gravel	35	30	20	25	25	15	30
Sand	5	--	5	10	10	5	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	30/3	40/3	20/3	25/3	20/3	10/3	10/2
15. Rearing Area %	40	30	35	45	35	30	25
16. Pool Cover %	20	25	20	20	20	20	5
17. Riffle Cover %	15	10	10	15	10	15	10
18. Fish Observed (fry)	DV	DV	DV	DV	DV	DV	DV
(fry)	SS	SS	SS	SS	SS	SS	SS
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 4: Gradient levels out over gravel substrate.
55m; Tributary right side (Survey Area "B").
90m; Blowdown right side.

Section 5: Good cobble riffle with vegetative slime on substrate, good overhanging cover.

Section 6: 10m; Forbs in stream.
30m; Blowdown left side with blue clay exposure.

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LEVEL TWO HABITAT SURVEY

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- Section 7: 0m; Increased numbers of blowdown and instream log with pockets of gravel and sand behind logs.
70m; Midstream gravel bar for 30 meters.
- Section 8: Cobble substrate midstream, gravel to sides of channel with good ASA. Moderate blowdown.
- Section 9: 5m; Begin island for 70 meters. Best ASA in right channel.
50m; Tributary left side, left channel (Survey Area "C").
- Section 10: 0m; Rock pit, right side.
50m; Debris jam. Intermixed boulder/gravel substrate.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek

2. ADF&G Catalog No. 106-30-080

Survey Area "A": Main Stem

Reach Number	4	4	4	4	4	4	4
1. Section Number	11	12	13	14	15	16	17
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	350	285	25	330	00	355	335
4. Gradient	8	3	3.5	3.5	4	4	4
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1(2,3)	1(2)	1(2)	1(2)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	8	5	3	6	4	6	8
10. Undercut Bank Length	45	75	35	55	20	25	--
11. Stream Width:							
Channel	25	10	15	13	11	10	16
Water	*	10	15	13	11	10	16
12. Water Type %:							
SS	20	20	15	15	10	10	20
DS	15	20	10	10	10	5	25
SF	35	55	50	50	50	65	35
DF	30	5	25	25	30	20	20
13. Substrate %:							
Bedrock	30	30	--	--	--	--	--
Boulder	10	35	20	20	30	30	30
Large Cobble	10	20	30	30	35	35	35
Small Cobble	25	5	20	20	20	20	20
Gravel	10	--	25	25	10	10	10
Sand	--	--	5	5	5	5	5
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	5/3	--	--	--	--	5/3
15. Rearing Area %	30	40	20	20	15	10	35
16. Pool Cover %	5	5	20	20	30	25	25
17. Riffle Cover %	10	15	15	15	10	5	5
18. Fish Observed (fry)	DV	DV	DV	DV	DV	DV	DV
(fry)	SS	SS					SS
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 11: 0m; Gradient and velocity increase with increasing amount of boulder in the substrate.

50m; Begin rapids in channelized stream course.

Section 12: 50m; Debris jam.

Section 13: Steep banks with boulder/gravel substrate. Predominantly DV trout fry present.

Section 17: 15m; Debris jam. Blowdown on right side with soil slump exposure. Isolated forbs and grasses in stream. Isolated ASA above debris jam.

22. Investigators Gerry Merrigan Date 6/22/83

* 7.5/12

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek 2. ADF&G Catalog No. 106-30-080

Reach Number	4	5	5	5	5	5	5
1. Section Number	18	19	20	21	22	23	24
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	335	340	345	350	355	335	350
4. Gradient	3	1.5	1.5	1.5	1.5	1.5	1.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1(2)	1(2)	1(2)	1(2)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	6	2	1	2	1	1	--
10. Undercut Bank Length	20	--	--	--	--	--	--
11. Stream Width:							
Channel	15	25.5	13	16	18	21	18
Water	15	25.5	13	16	18	21	18
12. Water Type %: SS	20	25	25	20	30	20	20
DS	10	10	10	10	20	20	20
SF	70	65	65	70	50	60	60
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	3
Boulder	25	--	--	--	--	5	12
Large Cobble	35	10	10	15	10	15	25
Small Cobble	20	30	30	30	30	30	30
Gravel	20	50	45	45	50	40	25
Sand	--	10	15	10	10	10	5
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	10/3	30/3	35/3	20/2	15/2	15/2	15/2
15. Rearing Area %	40	35	30	40	30	35	40
16. Pool Cover %	15	5	5	30	5	10	5
17. Riffle Cover %	5	5	5	5	5	2	2
18. Fish Observed (fry)	SS	SS	SS	SS	SS	SS	SS
	DV	DV	DV	DV	DV	DV	DV
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 18: 50m; Gradient decreasing, substrate size decreasing. Heavy concentrations of coho fry.

Section 19: 0m; Enter unit; both banks cut to stream. Low gradient with good riffles and no canopy. H₂O temperature, 20°C (68°F); pH, 7.7. Stream widens as gradient, depth and velocity decrease. Aquatic slime on substrate.

Section 21&22: Heavy amounts of aquatic vegetation on substrate. Occasional soil slumps in unit, both banks.

Section 23: 50m; Begin isolated boulder among gravel still with aquatic slime.

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LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek 2. ADF&G Catalog No. 106-30-080

Reach Number	6	6	6	6	6	6	6
1. Section Number	25	26	27	28	29	30	31
2. Section Length	100	100	100	100	100	100	50
3. Compass Bearing	345	335	260	300	340	230	315
4. Gradient	2	4	1.5	1	2	2	2
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	A/B	A/B	B	B
7. Bank Stability	1(2)	1(2)	1(2)	1(1)	1(1)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	--	10	1	2	1	3	--
10. Undercut Bank Length	--	--	--	--	--	--	--
11. Stream Width:							
Channel	18.0	10.0	13.5	30.0	22.0	24.0	18.0
Water	18.0	10.0	13.5	30.0	22.0	24.0	18.0
12. Water Type %: SS	20	20	30	50	30	30	20
DS	10	10	10	20	10	10	30
SF	60	45	60	30	60	60	30
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	20	10	30	--	--	30
Boulder	25	25	30	30	35	35	25
Large Cobble	35	30	30	20	30	30	20
Small Cobble	20	15	15	5	20	20	20
Gravel	15	5	10	5	10	10	5
Sand	5	5	5	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	15/2	20/2	12/2	10/2	5	5	--
15. Rearing Area %	30	30	35	70	30	25	30
16. Pool Cover %	2	10	5	5	5	5	15
17. Riffle Cover %	2	10	5	--	15	15	5
18. Fish Observed (fry)	DV	DV	--	DV	--	DV	--
(fry)	SS			SS		SS	
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	Y2
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 25: 0m; End aquatic slime over substrate. Begin increasing gradient: increased substrate size (boulder/cobble) with decreased ASA.

100m; Old road crossing; bridge pulled.

Section 26: 30m; Water temperature, 16°C.

50m; 2 meter cascade over bedrock for 30 meters. Gradient flattens out above cascade.

100m; Sharp dogleg to left. Substrate is mixed boulder/bedrock with isolated patches of gravel. Stream widening, gradient declining.

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LEVEL TWO HABITAT SURVEY
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Section 26: 100m; Resume aquatic slime on substrate.

Section 27: 10m; Tributary right side. Insignificant habitat.

Section 28: 50m; Bedrock substrate for 30 meters.

Section 31: Cascade/falls complex approximately 30 meters in height over bedrock (limestone).

Reconnaissance Above Falls: Stream flow continues for 40 meters over limestone bedrock, then enters cavern with 20 meter by 7 meter opening. Roof of cavern slopes downward to meet stream 20 meters from opening. End of survey. No fish observed above falls. Water temperature, 17°C; pH, 8.0.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek 2. ADF&G Catalog No. 106-30-080

Survey Area "B": Section 4: 55m

Reach Number	1						
1. Section Number	1						
2. Section Length	100						
3. Compass Bearing	70						
4. Gradient	3.5						
5. Water Quality	1						
6. Bank Type	A						
7. Bank Stability	1(1)						
8. Bank Vegetation	1,3-5						
9. Debris Loading	16						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	3.6						
Water	2.2						
12. Water Type %: SS	10						
DS	20						
SF	70						
DF	--						
13. Substrate %:							
Bedrock	--						
Boulder	5						
Large Cobble	15						
Small Cobble	25						
Gravel	45						
Sand	10						
Muck	--						
Other	--						
14. ASA %/Quality	20/2						
15. Rearing Area %	30						
16. Pool Cover %	35						
17. Riffle Cover %	35						
18. Fish Observed (fry)	DV						
(fry)	SS						
19. Sampling	N						
20. Potential Barriers	N						
21. Enhancement/Rehab	N						

Section 1: 0m; Good cover over gravel substrate, approximately 2.5 cfs, clear water, 8.0 pH, heavy blowdown, water temperature, 11°C.
60m; Gradient increase.
100m; Road crossing via log culvert, stable. Increasing gradient up hillside above road.

22. Investigators Gerry Merrigan Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name 108 Creek

2. ADF&G Catalog No. 106-30-080

Survey Area "C": Section 9: 50m Main Stem

Reach Number	1	1	1	1			
1. Section Number	1	2	3	4			
2. Section Length	100	100	100	50			
3. Compass Bearing	270	210	220	300			
4. Gradient	1.5	1.5	2.0	12.0			
5. Water Quality	1	1	1	1			
6. Bank Type	B/A	A	A	B			
7. Bank Stability	1(1)	1(1)	1(2)	1(2)			
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5			
9. Debris Loading	19	8	12	5			
10. Undercut Bank Length	70	40	70	--			
11. Stream Width:							
Channel	5.0	6.7	2.8	2.5			
Water	3.0	2.5	2.1	2.2			
12. Water Type %: SS	35	40	30	20			
DS	15	15	20	--			
SF	15	15	20	--			
DF	50	45	50	80			
13. Substrate %:							
Bedrock	--	--	--	20			
Boulder	--	--	5	35			
Large Cobble	15	15	20	30			
Small Cobble	45	35	35	10			
Gravel	40	40	30	5			
Sand	--	10	10	--			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	35/3	22/3	18/3	--			
15. Rearing Area %	65	65	50	10			
16. Pool Cover %	70	45	40	5			
17. Riffle Cover %	60	50	30	15			
18. Fish Observed (fry)	SS	SS	SS	--			
(fry)	DV	DV	DV	--			
19. Sampling	N	N	N	N			
20. Potential Barriers	N	N	N	N			
21. Enhancement/Rehab	N	N ₀	N	N			

Section 1: 0m; Water temperature, 12°C; pH, 7-8; about 3.0 cfs. Clear water at normal level. Stream flows over loose gravel with heavy salmon-berry cover.

100m; Flow through spruce flat with heavy blowdown and a few forbs in stream at side of channel.

Section 3: Many small debris jams and instream debris.

90m; Gradient and substrate size increasing.

Section 4: No fish. Gradient up to 76%. Numerous muskeg tributaries, right side with no habitat.

22. Investigators Gerry Merrigan

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FISH SAMPLING FORM

Stream Name 108 Creek ADF&G Catalog No. 106-30-080 Date 6/23/83

Identify Survey Area A Water Temp. as indicated Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1125	1900	CO - 3	H ₂ O: 14°C	Section 1: 5m; left side above old weir site.
2	1620	1800	SS - 5 SB - 5	H ₂ O: 20°C	Section 26: 10m; Reach V Right side at old road crossing.

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

108 Creek
106-30-080

DATE	PINK	CHUM	OTHER SPECIES COHO	REMARKS
9/2/60	11,500	3,500		
8/30/61	106,000			
1962	132,198			Weir
8/27/62		6	2	
1963	67,315	40	2881	Weir
1964	134,999	981	632	Weir
8/27/65	57,000			
1966	109,295	22	2506	Weir
1967	19,623	357	741	Weir
1968		557	1464	Weir
8/26/68	54,000			
1969	38,684	55	1332	Weir
1970	29,695	99	1780	Weir
1971	99,712	428	2507	Weir
8/31/72	27,500			
8/31/73	138,000			
9/10/74	78,000			
9/08/75	120,000			
9/23/76	318,000			
9/29/77	34,830			
8/22/78	32,700			
9/26/78			40	
8/28/79	40,050			
9/17/80	32,400			
10/13/80			22	
9/04/81		5		
9/23/81	12,660			
9/20/82	37,450			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100-300 m
3. Historical Fish Species PS and CS

Part II.

1. Stream Name Whale Passage West Head 2. ADF&G Catalog No. 106-30-77
3. Latitude 56°06'48" Longitude 133°08'53"
4. Agency Unit 05 5. Mgmt. Area 538 K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 79-22-679-132/133 79-21-679-180/181 79-23-679-30
8. Bay/Drainage Whale Pass 9. Access 1
10. Present Land Use state land disposal/home sites
11. Historical Land Use upper watershed above survey is clearcut
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 7.0 cfs 14. Flow Stage 2
15. Stream Temperature 10.5 16. pH 8.0 17. Beaver yes
18. Temperature Sensitivity no
19. Barrier yes; barrier falls 3200 m above ITZ 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 20 % Gravel/S. Cob. 65 %
L. Cob/Boulder/Bedrock 15 %
B. Gradient 1.5 %
C. ASA % 5/poor
D. Schooling Whale Pass and ITZ at high tide
E. Shellfish moderate throughout Whale Pass
F. Anchorage Whale Pass

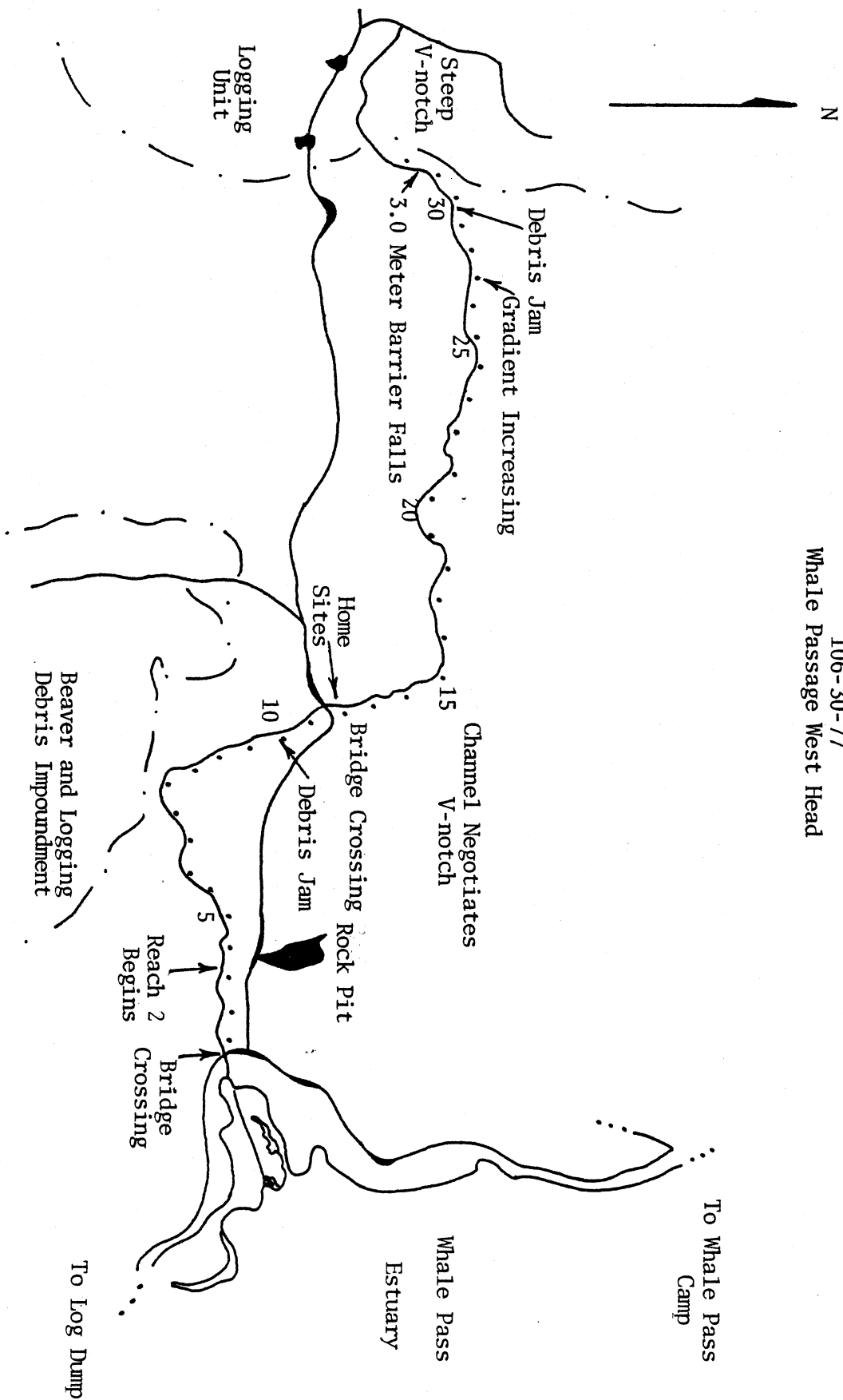
22. Comments

Stream Evaluation

This moderately sized stream is characterized by a clearcut upper watershed, an extensive IT estuary, and numerous habitat types in between. Moderate numbers of rearing coho fry were observed in this historic producer of pink and chum salmon. A definitive migratory barrier was identified 3400 meters above the ITZ as well as numerous "potential low flow" debris barriers. Excellent rearing and spawning habitat was observed as well as copious blowdown, beaver activity, localized channel migration, and several boulder/bedrock V-notches. Land lottery homesites border the stream in Section 12.

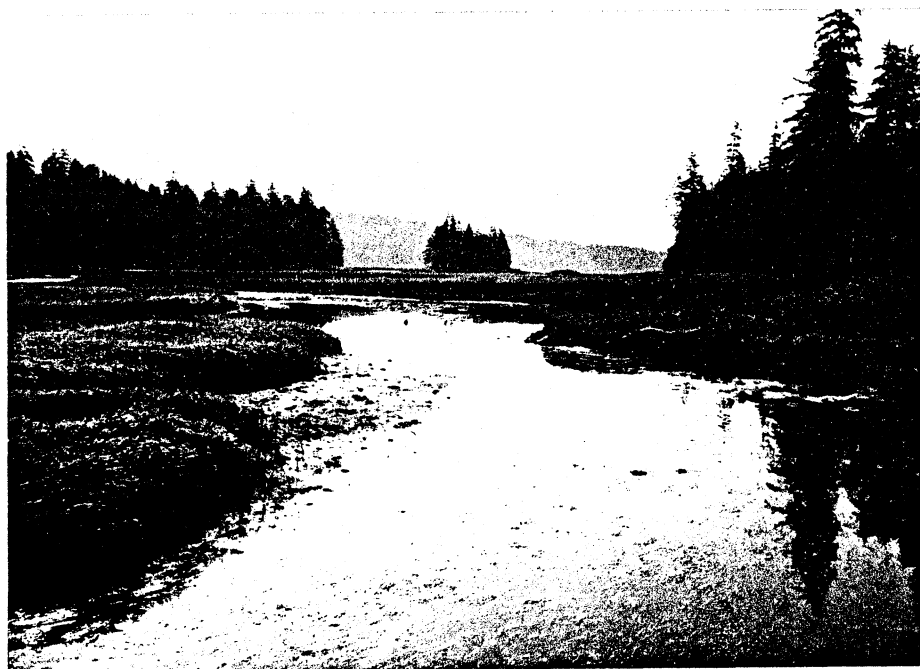
23. Investigators Ted Mickowski 24. Date 6/24/83

106-30-77
Whale Passage West Head





1. Upper ITZ forms an extensive, productive estuary. Channel enters timber left center.



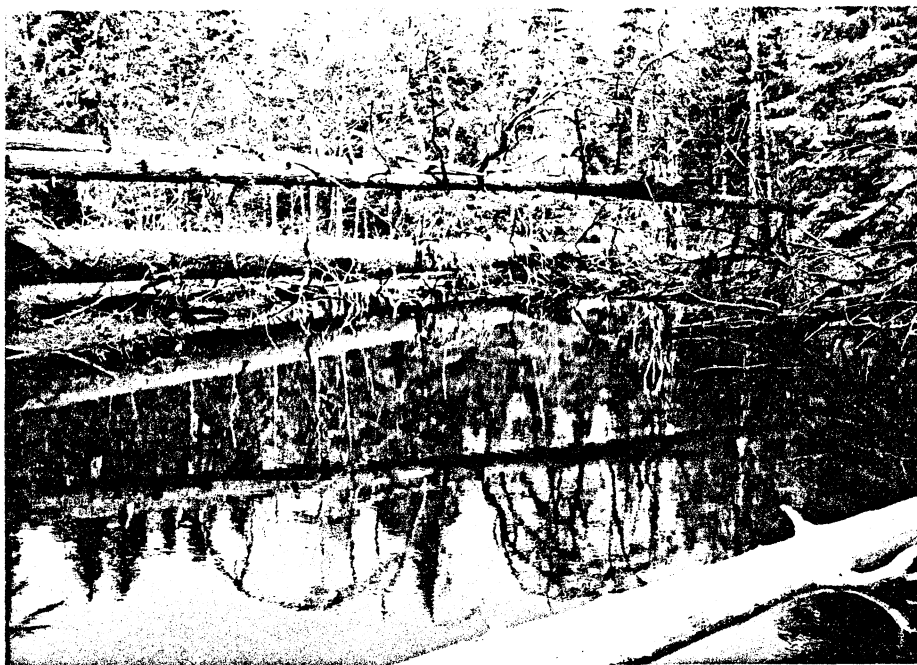
2. View of extensive estuary to Whale Pass. The ITZ provides excellent rearing habitat, however, abundant interstitial fines reduces ASA.



3. Section 1: The ITZ ends approximately 75 meters above a bridge crossing and the habitat type is predominantly boulder riffles.



4. Section 3: Channel broadens and copious blowdown provides good rearing cover.



5. Section 8: Logging debris and beaver activity create an extensive rearing impoundment.



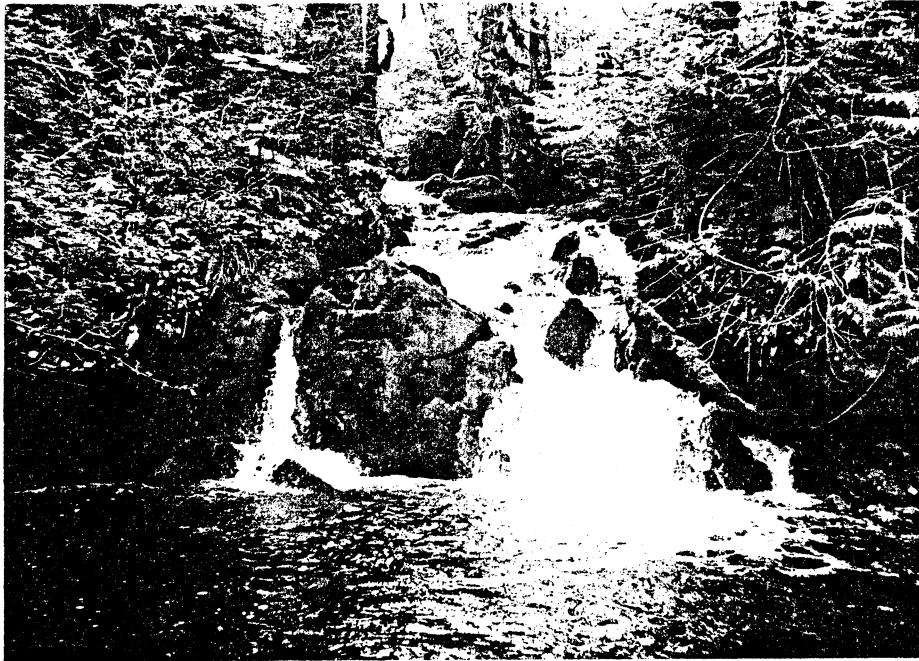
6. Section 10: Debris jam represents a potential low flow barrier.



7. Section 15: Channel negotiates a V-notch via boulder/bedrock cascades.



8. Section 23: Between V-notches gradient is reduced and gravel/cobble riffles provide excellent ASA.



9. Section 32: A 3.0 vertical meter bedrock falls followed by 9.0 meters of high velocity cascade creates an effective migratory barrier.



10. Reconnaissance above barrier falls revealed continuous boulder cascades, a steep narrow V-notch, and extensive clearcutting of the upper watershed.

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	3.6	1	3.6					
2	100	11.1	3	33.3					
3	100	8.1	20	162.0					
4	100	10.0	20	200.0					
5	100	5.5	30	165.0					
6	100	8.7	15	130.5					
7	300	9.0	10	270.0					
8	100	8.5	15	127.5					
9	100	7.5	15	112.5					
10	100	9.0	10	90.0					
11	100	4.5	5	22.5					
12	100	6.6	5	33.0					
13	100	8.1	12	97.2					
16	100	8.4	2	16.8					
17	100	10.0	2	20.0					
18	100	9.3	2	18.6					
19	100	5.7	20	114.0					
20	100	7.0	20	140.0					
21	100	6.0	10	60.0					
22	100	5.1	10	51.0					
23	100	7.5	20	150.0					
25	100	7.2	5	36.0					
26	100	4.5	7	31.5					
27	100	4.8	3	14.4					
Total				2,099.4m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Passage West 2. ADF&G Catalog No. 106-30-77
Head

Reach Number	1	1	2	2	2	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	285	273	309	239	239	254	237
4. Gradient	3	1.5	1.5	1.5	2.0	1.5	1.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B/A	B/A	B/A	B/A	B/A
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1,3-5	1,3-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	3	3	10	5	15	15	25
10. Undercut Bank Length	30	120	100	70	60	30	--
11. Stream Width:							
Channel	5.1	11.1	8.1	10	5.5	8.7	17.5
Water	3.6	11.1	8.1	10	5.5	8.7	9.0
12. Water Type %: SS	10	15	45	45	25	30	15
DS	5	10	10	10	10	15	40
SF	75	70	45	45	60	35	35
DF	10	5	--	--	5	20	10
13. Substrate %:							
Bedrock	--	12	8	--	--	--	--
Boulder	25	15	--	--	1	--	1
Large Cobble	30	25	--	--	4	5	2
Small Cobble	25	25	35	35	30	40	17
Gravel	15	15	45	50	50	40	25
Sand	5	8	12	15	15	15	20
Muck	--	--	--	--	--	--	35
Other	--	--	--	--	--	--	--
14. ASA %/Quality	1/2	3/2	20/3	20/3	30/3	15/3	10/3
15. Rearing Area %	10	10	15	20	20	20	35
16. Pool Cover %	10	10	10	10	20	30	25
17. Riffle Cover %	10	5	--	--	--	--	--
18. Fish Observed (fry) SS	<6	<6	<12	<12	<12	>12	>25
(juv) CT/RB			1				
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: 75m; Above a bridge crossing the ITZ ends. The predominant habitat type is boulder/cobble cascades. Rearing habitat is limited and ASA is isolated and moderately compact.

Section 3: A predominantly gravel channel broadens, demarcating Reach 2. Blowdown is moderate and dense overhanging banks provide rearing cover. ASA is good-excellent.

Section 4-5: Extensive gravel riffles provide good-excellent ASA.

22. Investigators Ted Mickowski Date 6/24/83

LEVEL TWO HABITAT SURVEY

Section 6: Blowdown and overhanging vegetation provide excellent rearing cover. ASA remains common. Channel braids through debris and brush "islands". A blown out beaver dam marks the extent of Section 6.

Section 7: Gravel riffles and debris provide good-excellent spawning and rearing habitat.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Passage West 2. ADF&G Catalog No. 106-30-77
Head

Reach Number	3	4	4	5	5	5	5
1. Section Number	8	9	10	11	12	13	14
2. Section Length	300	100	100	100	100	100	100
3. Compass Bearing	359	314	02	27	29	349	342
4. Gradient	1.5	2.0	2.0	2.5	3.5	3.0	2.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B/A	B/A	B/A	B/A	B/A	B/A	
7. Bank Stability	2/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	15	15	20	2	10	10	5
10. Undercut Bank Length	75	25	60	20	--	--	--
11. Stream Width:							
Channel	15.6	15.3	9.0	9.0	9.0	8.1	10.8
Water	8.5	7.5	9.0	4.5	6.6	8.1	5.1
12. Water Type %:							
SS	35	15	15	15	10	10	10
DS	15	15	20	5	10	15	20
SF	50	60	50	75	75	75	70
DF	--	10	15	5	5	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	1	--
Boulder	--	5	10	20	20	20	30
Large Cobble	20	20	30	35	35	20	25
Small Cobble	35	40	30	25	25	20	20
Gravel	30	30	25	15	15	35	20
Sand	15	5	5	5	5	4	5
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	15/3	15/3	10/3	5/3	5/3	12/3	--
15. Rearing Area. %	20	25	25	10	10	15	10
16. Pool Cover %	25	20	25	10	15	15	5
17. Riffle Cover %	5	10	10	10	10	10	10
18. Fish Observed (fry) SS	<12	<6	>12	--	<12	>12	>12
(juv) CT/RB						1	
19. Sampling	N	N	N	N	Y	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 8: 68m; A remnant beaver dam demarcates Reach 3. Channel diverges around a debris and brush covered "island". The right channel is characterized by deep pools, copious debris, and a muck substrate. An extensive clearcut unit borders the left channel which typically contains dense debris and "pockets" of suitable spawning substrate. 200m; Beaver dam in ill repair creates an extensive rearing impoundment.

22. Investigators Ted Mickowski Date 6/24/83

LEVEL TWO HABITAT SURVEY

- Section 9: Beaver activity ends and stream flow begins, marking the advent of Reach 4.
- Section 10: 75m; Logging debris jam represents a potential low flow barrier.
- Section 11: Substrate becomes increasingly coarse. Large cobble and boulders predominate, demarcating Reach 5.
85m; Logging road bridge crossing.
- Section 12: Land lottery homesites border stream along both banks. Channel diverges around alder covered "isle" for 34 meters. Blow down moderate.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Passage West 2. ADF&G Catalog No. 106-30-77
Head

Reach Number	6	6	6	6	7	7	7
1. Section Number	15	16	17	18	19	20	21
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	296	261	276	294	214	275	321
4. Gradient	3.5	4.0	6.0	3.5	2.0	1.5	1.5
5. Water Quality	1	1	1	1	1	1	1
6. Bank Type	B	B	B	B	B	A/B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1-5	1-5	1-5	1-5	1-5	1-5	1-5
9. Debris Loading	5	3	5	7	7	6	5
10. Undercut Bank Length	--	--	--	--	60	90	75
11. Stream Width:							
Channel	12.6	10.8	10.0	9.3	7.8	7.0	7.8
Water	8.7	8.4	10.0	9.3	5.7	7.0	6.0
12. Water Type %: SS	10	10	5	10	15	20	--
DS	5	--	10	15	20	15	--
SF	75	80	80	65	55	50	--
DF	10	10	5	10	10	15	--
13. Substrate %:							
Bedrock	10	40	30	15	--	--	2
Boulder	30	20	25	25	--	1	4
Large Cobble	25	15	15	15	20	15	15
Small Cobble	20	15	20	25	45	45	30
Gravel	15	10	10	20	30	30	40
Sand	--	--	--	--	5	9	9
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	2/3	2/3	2/3	20/3	20/3	10/3
15. Rearing Area %	10	1	5	10	30	20	15
16. Pool Cover %	10	10	10	20	30	20	10
17. Riffle Cover %	10	10	10	10	5	--	5
18. Fish Observed (fry) SS	<12	--	--	<6	<25	<25	--
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 15: Channel negotiates V-notch via boulder/bedrock cascades. Rearing is limited to peripheral pools and cover is principally substrate induced.

Section 17: Nearly continuous bedrock cascades with plunge pools beneath.

Section 18: 45m; A 1.5 cfs tributary enters the main stem via the right bank and rapidly climbs a bedrock notch, culminating in a barrier falls. No fish or habitat observed.

22. Investigators Ted Mickowski Date 6/24/83

LEVEL TWO HABITAT SURVEY

Section 19: Reduced gradient, small cobble/gravel riffles, and moderate debris provide excellent rearing/spawning habitat and demarcates Reach 7.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Passage West 2. ADF&G Catalog No. 106-30-77
Head

Reach Number	8	8	8	8			
1. Section Number	29	30	31	32			
2. Section Length	100	100	100	100			
3. Compass Bearing	224	237	229	190			
4. Gradient	3.5	3.5	3.5	>10			
5. Water Quality	1	1	1	1			
6. Bank Type	A/B	A/B	B	B			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1-5	1-5	1-5	1-5			
9. Debris Loading	5	15	3	--			
10. Undercut Bank Length	--	--	20	--			
11. Stream Width:							
Channel	7.2	6.9	9.0	4.2			
Water	4.5	4.5	4.2	4.2			
12. Water Type %: SS	5	10	5	5			
DS	5	15	--	5			
SF	70	65	90	80			
DF	20	10	5	10			
13. Substrate %:							
Bedrock	15	--	10	30			
Boulder	35	20	20	25			
Large Cobble	30	40	40	20			
Small Cobble	15	25	20	15			
Gravel	5	15	10	10			
Sand	--	--	--	--			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	--	--	--	--			
15. Rearing Area %	5	10	5	--			
16. Pool Cover %	10	15	10	--			
17. Riffle Cover %	10	10	10	--			
18. Fish Observed (fry) SS	6	4	2	--			
(juv) CT/RB		4					
19. Sampling	N	N	N	N			
20. Potential Barriers	N	Y	N	Y			
21. Enhancement/Rehab	N	N	N	N			

Section 30: 42m; An extensive debris jam creates a potential migratory impass.
 Section 31: Buffer strip borders right bank. Conspicuous change in substrate color; cobbles are white.

Section 32: 34m; A less than 1 cfs tributary enters the main stem via the left bank and provides limited rearing habitat before diverging into two steeply climbing bedrock chutes.

43m; A 3 vertical meter bedrock falls followed by 9 meters of high velocity bedrock cascade, creates an effective migratory barrier.

22. Investigators Ted Mickowski Date 6/24/83

LEVEL TWO HABITAT SURVEY

Reconnaissance above barrier revealed continuous boulder cascades; a steep, narrow V-notch, and extensive clearcutting of the upper watershed. No fish or habitat were observed.

FISH SAMPLING FORM

Stream Name Whale Passage ADF&G Catalog No. 106-30-77 Date 6/24/83

Identify Survey Area A Water Temp. 10.5 Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1005	1915	SS - 4 RB - 1	--	Section 1
2	1320	1820	--		Section 12

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

106-30-77

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
8/26/70	3,000			
9/08/70	-	200		
8/09/73	200			
8/30/74	40	2		
9/03/75	420	40		
9/13/78	2,800			
8/12/80	75			
9/23/81	425			
10/05/82	150	1		

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 - 150 m
 3. Historical Fish Species PS

Part II.

1. Stream Name Neck Creek 2. ADF&G Catalog No. 106-30-75
 3. Latitude 56°05'55" Longitude 133°08'25"
 4. Agency Unit 05 5. Mgmt. Area 550 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-23-679-32
 8. Bay/Drainage Whale Pass 9. Access 1
 10. Present Land Use Logging road crosses at IT/stream ecotone
 11. Historical Land Use none
 12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow >100 cfs 14. Flow Stage 2.5
 15. Stream Temperature 18°C 16. pH 7.8 17. Beaver no
 18. Temperature Sensitivity yes; lake source
 19. Barriers yes; 3 bedrock barrier falls 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 10 % Gravel/S. Cob. 20 %
 L. Cob/Boulder/Bedrock 70 %
 B. Gradient 3.5%
 C. ASA % 0 (high tide)
 D. Schooling Whale Pass & estuary
 E. Shellfish moderate throughout Whale Pass
 F. Anchorage Whale Pass

22. Comments

Stream Evaluation

A less than 1 cfs muskeg drainage enters the ITZ via the left bank, approximately 120 meters below the advent of Section 1. Low flow, abundant instream forbs/algae and a cobble/boulder substrate provides marginal rearing habitat. No fish or ASA observed.

Neck Creek drops 87 vertical feet from Neck Lake to the ITZ, a distance of approximately 500 meters. Three sets of barrier falls were encountered, the first of which delineates the extent of the ITZ. No fish or ASA were observed during the survey and rearing habitat was marginal, being confined to peripheral boulder pools. Escapement records indicate historical ITZ use by pink salmon, however, at time of survey (i.e. tidal stage) no ASA was observed. No enhancement or rehabilitation recommended.

23. Investigators Ted Mickowski 24. Date 6/23/83

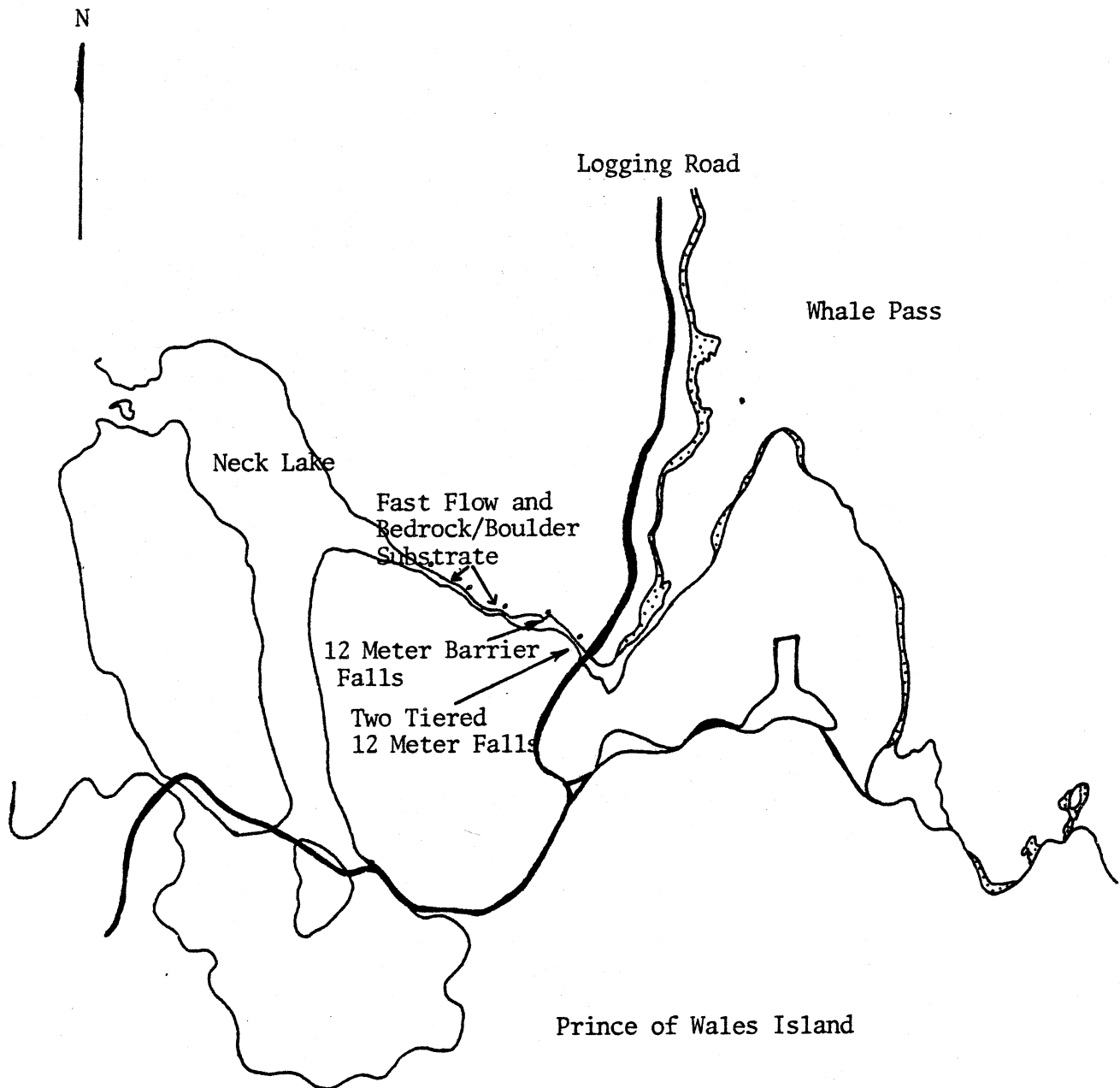
LEVEL TWO HABITAT SURVEY

Section 2: A 12 vertical meter barrier falls delineates the lower extent of Section 2. Above the falls, the bedrock/boulder channel becomes a uniform progression of tiered cascades. No spawning habitat was observed and marginal rearing was confined to peripheral boulder pools (Photos 4 & 5).

Section 3-4: A bedrock/boulder channel and typically fast flow provides marginal and extremely limited rearing habitat. No fish or ASA were observed. Aquatic moss and deep, slow pools provide limited rearing near lake confluence (Photo 6).

Survey terminated at stream/lake interface, approximately 500 meters above the intertidal zone.

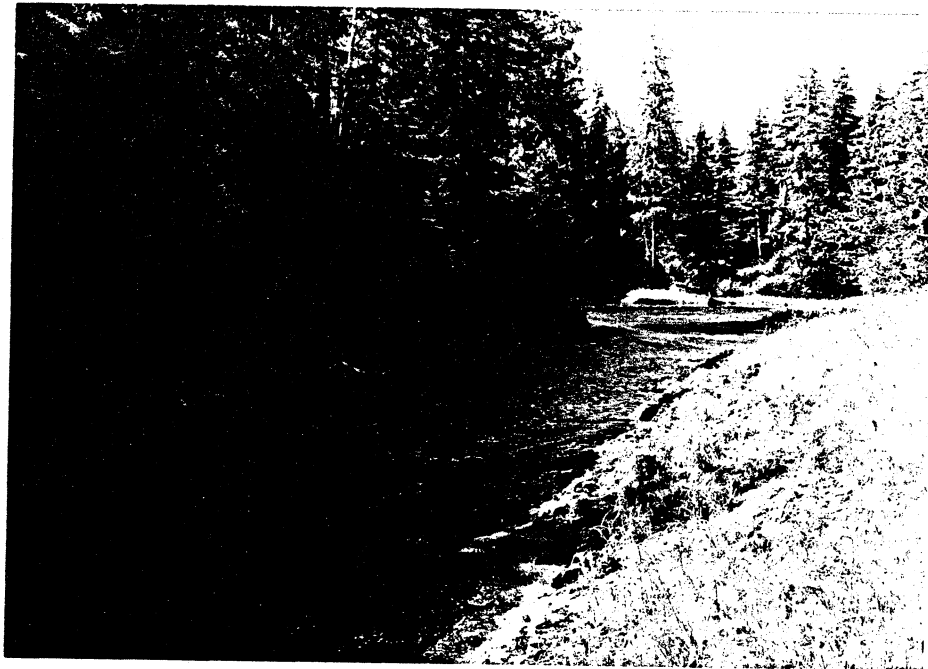
106-30-75
Neck Creek



Neck Creek
106-30-75



1. An extensive ITZ drains into a lagoon providing excellent holding and rearing habitat.

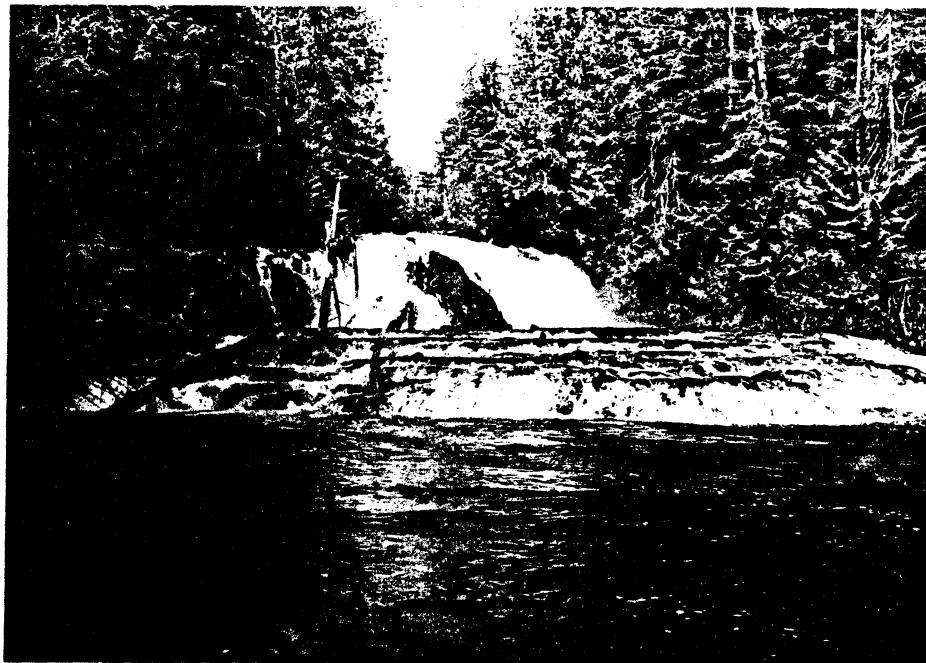


2. View of mid ITZ. The bulk of PS spawning occurs below this point and a migration barrier occurs approximately 150 m upstream.

Neck Creek
106-30-75



3. Section 1: The ITZ ends at the base of these 5 and 7 vertical meter bedrock barrier falls.



4. Section 2: Bedrock stair-step cascades culminate in a 12 vertical meter barrier falls.

Neck Creek
106-30-75



5. Section 2: Above barrier channel becomes a uniform progression of tiered cascades. Minimal rearing and no spawning habitat observed.



6. Section 4: View beyond Section 4 to lake confluence, left center. Aquatic moss and deep, slow pools provide limited rearing along left bank.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Neck Creek 2. ADF&G Catalog No. 106-30-75

Reach Number	1	1	1	1			
1. Section Number	1	2	3	4			
2. Section Length	120	100	100	150			
3. Compass Bearing	280	277	319	304			
4. Gradient	>15	>20	3	2			
5. Water Quality	3	3	3	3			
6. Bank Type	B	B	B	B			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5			
9. Debris Loading	2	3	2	4			
10. Undercut Bank Length	--	--	--	--			
11. Stream Width:							
Channel	30	30	24	23.5			
Water	30	30	24	23.5			
12. Water Type %: SS	--	--	15	15			
DS	--	--	--	15			
SF	30	30	25	40			
DF	70	70	60	30			
13. Substrate %:							
Bedrock	60	50	50	50			
Boulder	30	30	30	30			
Large Cobble	10	10	10	10			
Small Cobble	--	5	5	5			
Gravel	--	--	--	--			
Sand	--	--	--	--			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	--	--	--	--			
15. Rearing Area %	--	--	5	10			
16. Pool Cover %	--	--	5	10			
17. Riffle Cover %	--	--	--	--			
18. Fish Observed							
19. Sampling	N	N	N	N			
20. Potential Barriers	Y	Y	N	N			
21. Enhancement/Rehab	N	N	N	N			

Section 1: The ITZ ends at the base of a multi-tiered bedrock barrier falls. 30 meters of bedrock and boulders separate the 5 and 7 vertical meter high falls. A bedrock/boulder channel and continuous high velocity flow is encountered to the base of a third barrier falls, demarcating Section 2.

22. Investigators Ted Mickowski Date 6/23/83

FISH SAMPLING FORM

Stream Name Neck Creek ADF&G Catalog No. 106-30-75 Date 6/23/83

Identify Survey Area A Water Temp. 18°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1145	1320	CO - 9	--	ITZ

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD
Neck Creek
106-30-75

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
8/22/66	--			
9/13/70	200			
8/10/71	--			
8/30/72	--			
8/30/74	900			
9/03/75	2000			
9/02/77	1531			
8/20/78	500			
8/08/79	75			
8/12/80	30			
9/04/81	500			
9/20/82	150			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #4 2. ADF&G Catalog No. n/a
3. Latitude 56°04'50" Longitude 133°07'00"
4. Agency Unit 05 5. Mgmt. Area 550K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 23 Photo 34
8. Bay/Drainage Whale Pass 9. Access 2
10. Present Land Use None
11. Historical Land Use None
12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow about 2 cfs 14. Flow Stage 2
15. Stream Temperature -- 16. pH 6.0 17. Beaver Yes
18. Temperature Sensitivity Slow flowing; southern exposure beaver pond.
19. Barrier Beaver Dam 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 50 % Gravel/S. Cob. 35 %
L. Cob/Boulder/Bedrock 15 %
B. Gradient 2.5 %
C. ASA % No
D. Schooling No; high tide only, or in bay.
E. Shellfish Moderate
F. Anchorage Whale Pass

22. Comments

Stream Evaluation

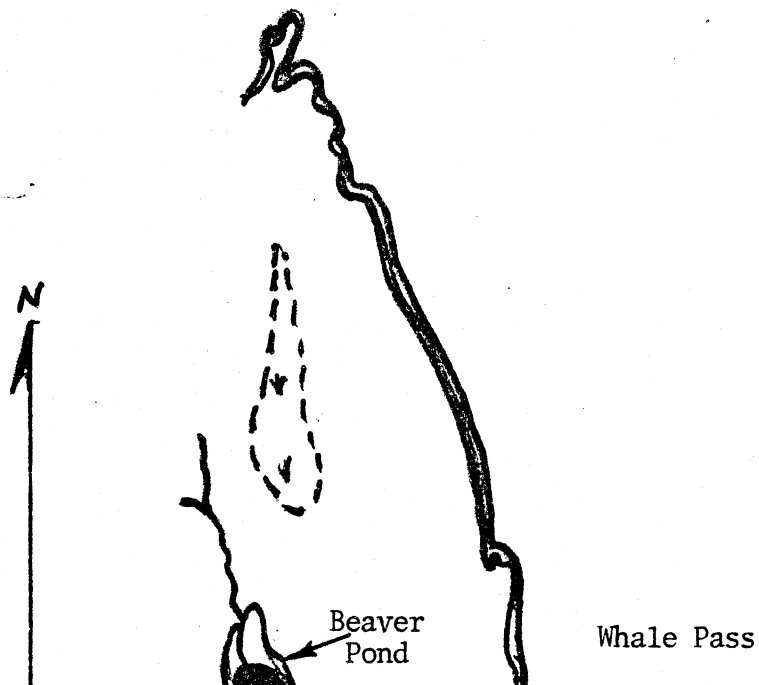
This is a short non-productive stream that terminates into a beaver pond. No fish were observed.

23. Investigators Gerry Merrigan 24. Date 6/24/83

Whale Pass #4



3. Angular bedrock of stream mouth.



8.	Bank Vegetation	1(3,1)							
9.	Debris Loading	1,3-5							
		9							
10.	Undercut Bank Length	--							
11.	Stream Width:								
	Channel	1.5							
	Water	1.0							
12.	Water Type %: SS	60							
	DS	20							
	SF	20							
	DF	--							
13.	Substrate %:								
	Bedrock	5							
	Boulder	--							
	Large Cobble	20							
	Small Cobble	25							
	Gravel	25							
	Sand	10							
	Muck	20							
	Other	--							
14.	ASA %/Quality	--							
15.	Rearing Area %	70							
16.	Pool Cover %	20							
17.	Riffle Cover %	--							
18.	Fish Observed	--							
19.	Sampling	N							
20.	Potential Barriers	Y4							
21.	Enhancement/Rehab	N							

Section 1: 0m; Stream flow over moss covered angular bedrock.
5m; End bedrock and steep gradient. Forbs in stream.
50m; (3) Blowdown, left side.
60m; Enter grass meadow.
100m; Old inactive, but stable, beaver dam.

22. Investigators Gerry Merrigan Date 6/24/83

-246-



2. Downstream view of ITZ with pool looking toward Whale Pass.

-244-

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 meters
 3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #3 2. ADF&G Catalog No. n/a
 3. Latitude 56°04'25" Longitude 133°06'50"
 4. Agency Unit 05 5. Mgmt. Area 551K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 1979 Photos Fl. Ln. 24 Photo 207
 8. Bay/Drainage Whale Pass 9. Access 2
 10. Present Land Use None
 11. Historical Land Use None
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 3 cfs 14. Flow Stage 2
 15. Stream Temperature 12 16. pH 6.3 17. Beaver No
 18. Temperature Sensitivity No
 19. Barrier Yes, cascade at Section 14: 100m 20. Weather 2

Part III.

21. Intertidal

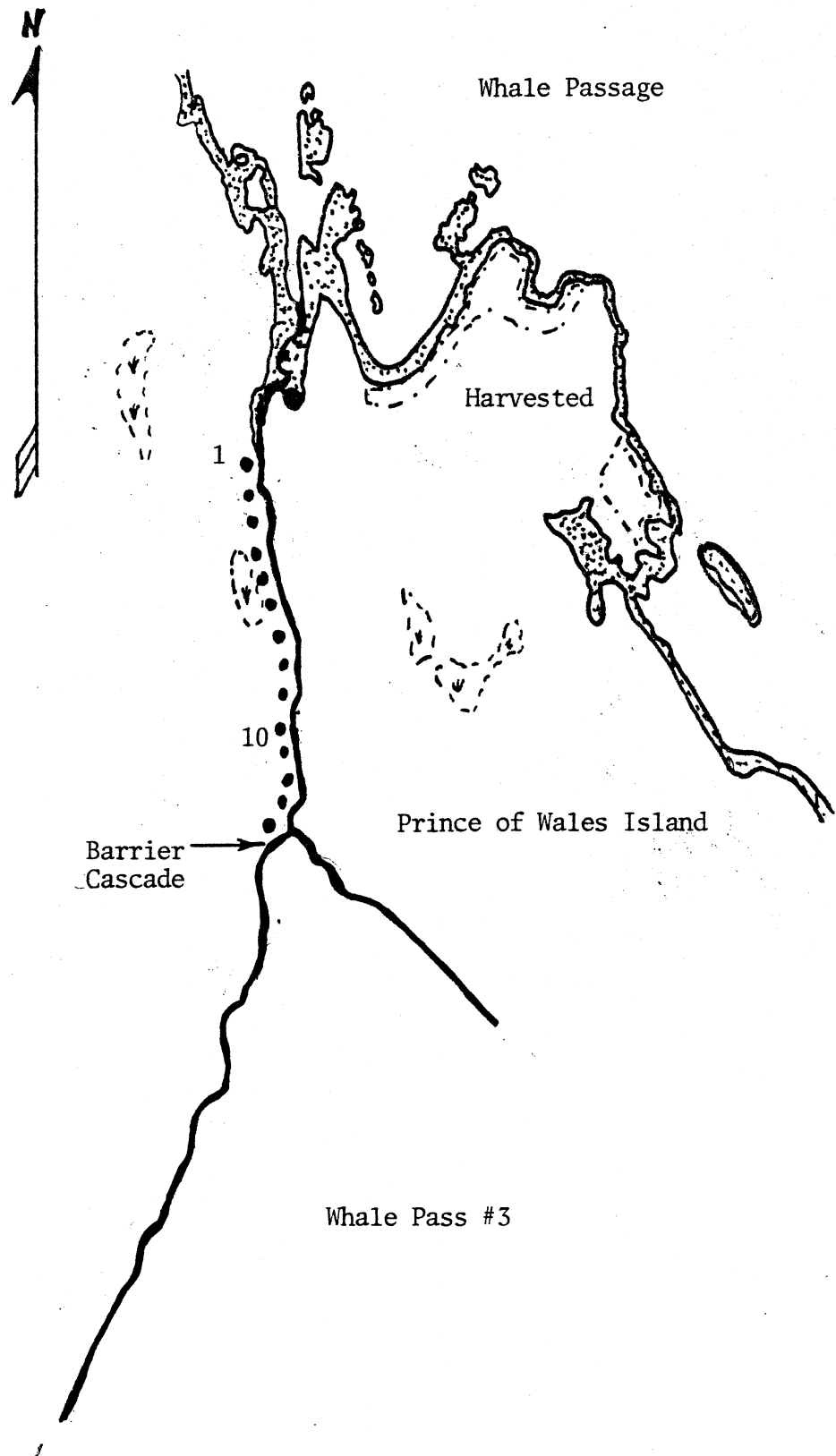
- A. Substrate: Fines 50 % Gravel/S. Cob. 30 %
 L. Cob/Boulder/Bedrock 20 %
 B. Gradient 1 %
 C. ASA % --
 D. Schooling High tide only.
 E. Shellfish Abundant clams.
 F. Anchorage Skiff only.

22. Comments

Stream Evaluation

The stream is of a sluggish nature with low velocity, instream forbs and considerable aquatic vegetation on the substrate. Consequently, fish habitat is of poor quality. No salmon fry were observed in the stream, only trout (cutthroat/DV fry and one adult DV). Windthrown areas are common throughout the stream. A barrier cascade at Section 14: 100m concludes the survey.

23. Investigators Gerry Merrigan 24. Date 6/22/83



Whale Pass #3

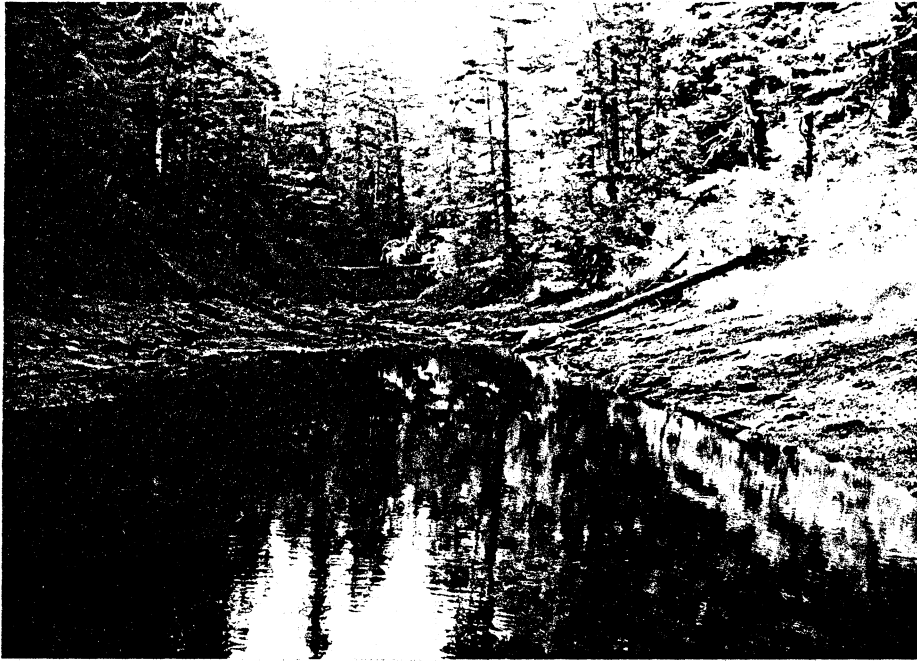


1. Lower ITZ of Whale Pass #3.



2. Downstream view of lower ITZ with rearing pond.

Whale Pass #3



3. Upper ITZ and mouth of stream.



4. Low velocity, meandering habitat of Section 2.

Whale Pass #3



5. Barrier cascade at Section 14: 100m with 25% gradient for 20m.

Whale Pass #3

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	2.2	--	--					
2	100	2.7	5	13.5					
3	100	2.0	8	16.0					
4	100	3.2	10	32.0					
5	100	1.0	5	5.0					
6	100	2.8	--	--					
7	100	1.9	5	9.5					
8	100	1.6	8	12.8					
9	100	3.0	10	30.0					
10	100	3.4	5	17.0					
11	100	2.0	12	24.0					
12	100	1.1	3	3.3					
13	100	2.0	--	--					
14	100	3.0	--	--					
Total				163.1m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #3

2. ADF&G Catalog No. --

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	160	130	210	205	160	180	180
4. Gradient	1	1	1.5	1.5	1.5	1.5	1
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	B/A	B/A	B/A	B/A	B	B	A
7. Bank Stability	1(1)	1(1)	1(1)	1(1)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	3	9	10	11	4	3	2
10. Undercut Bank Length	--	--	--	30	70	60	70
11. Stream Width:							
Channel	3.1	3.5	3.3	3.2	4.2	3.1	2.2
Water	2.2	2.7	2.0	3.2	1.0	2.8	1.9
12. Water Type %: SS	70	70	50	45	40	50	60
DS	10	--	10	20	30	20	10
SF	20	30	40	35	30	30	30
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	15	--	--	--	3	5	--
Boulder	10	--	--	--	7	15	5
Large Cobble	20	--	--	--	20	20	20
Small Cobble	15	20	20	20	20	15	20
Gravel	20	60	60	55	30	30	35
Sand	20	20	20	25	20	15	20
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	5/2	8/2	10/2	5/2	--	5/2
15. Rearing Area %	50	35	45	40	50	40	35
16. Pool Cover %	20	20	25	20	15	5	3
17. Riffle Cover %	--	2	15	10	2	5	5
18. Fish Observed	CT	--	CT	--	--	--	CT
	--	--	DV	DV	DV	--	DV
19. Sampling	Y	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: 0m; Stream flow channeled through stable banks and over tilted angular bedrock.

70m; Begin floodplain, right side. Forbs in stream.

Section 2: Broad, slow meandering stream course.

Section 3: Heavy blowdown.

Section 5: 30m; Begin moss covered cobble.

70m; Begin moss covered boulder and bedrock, banks steepening, stream course channelized.

22. Investigators Gerry Merrigan Date 6/22/83

LEVEL TWO HABITAT SURVEY .
Whale Pass #3

Section 6: Forbs in stream.

Section 7: Banks flattening out, resume meandering.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #3 2. ADF&G Catalog No. --

Reach Number	1	1	1	1	1	1	1
1. Section Number	8	9	10	11	12	13	14
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	160	230	200	200	150	180	210
4. Gradient	1	1.5	1	1.5	1.5	2	2
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	A	A/C	A	A	A/B	A/B	B
7. Bank Stability	1(2)	1(2)	1(2)	1(2)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	11	5	8	12	8	7	5
10. Undercut Bank Length	45	30	80	50	70	20	20
11. Stream Width:							
Channel	2.5	3.8	3.5	2.6	1.1	3.6	3.8
Water	1.6	3.0	3.4	2.0	1.1	2.0	3.0
12. Water Type %: SS	50	50	50	30	30	35	25
DS	25	25	20	10	15	25	10
SF	25	25	30	60	55	40	65
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	--	--	--
Boulder	2	--	--	--	5	5	15
Large Cobble	13	15	15	10	20	20	25
Small Cobble	25	25	20	15	25	25	30
Gravel	40	40	45	55	30	30	20
Sand	20	20	20	20	20	20	10
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	8/2	10/2	5/2	12/2	3/2	--	--
15. Rearing Area %	35	30	30	20	20	30	15
16. Pool Cover %	15	10	5	25	10	15	25
17. Riffle Cover %	2	5	2	5	10	5	10
18. Fish Observed (fry)	--	DV	DV	DV	--	DV	DV
(fry)		CT					
(adult)						DV	
19. Sampling	N	N	Y	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	Y1
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 8: Heavy blowdown and forbs in stream.

Section 9-11: Moderate blowdown.

Section 12: 70m; Begin boulder/cobble substrate.

Section 14: 95m; Tributary left side with 7% gradient and increasing as it heads up hillside. Water temperature, 12°C; water quality, light tan; pH, 6.5, flow normal at 1 cfs.

100m; Sharp dogleg to right ends in a barrier cascade that has 25% slope for 20m.

22. Investigators Gerry Merrigan Date 6/22/83

Reconnaissance above falls found increasing gradient and additional cascades; i.e., not recommended for enhancement.

FISH SAMPLING FORM

Stream Name Whale Pass #3 ADF&G Catalog No. -- Date 6/22/83

Identify Survey Area A Water Temp. 12°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1050	1304	SS - 3		Section 1: 50m; right side.
2	1205	1245	CO - 4		Section 10: 40m; midstream.

This form is used to record fish caught during Level Three, Four, or Five Surveys.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length variable
 3. Historical Fish Species PS, S, SS

Part II.

1. Stream Name none 2. ADF&G Catalog No. 106-30-74
 3. Latitude 56°03'05" Longitude 133°06'00"
 4. Agency Unit 05 5. Mgmt. Area 551 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. (8-26-79 12) 24 610050 579-206+ 23 610050 679-37
 8. Bay/Drainage Rocky Bay 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 1,5 13. Estimated Flow 6 cfs 14. Flow Stage 2
 15. Stream Temperature 12.5°C 16. pH 6.5 17. Beaver yes
 18. Temperature Sensitivity no
 19. Barrier 2 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 5 % Gravel/S. Cob. 30 %
 L. Cob/Boulder/Bedrock 65 %
 B. Gradient 2.0 %
 C. ASA % 20/fair
 D. Schooling yes
 E. Shellfish yes
 F. Anchorage Whale Pass

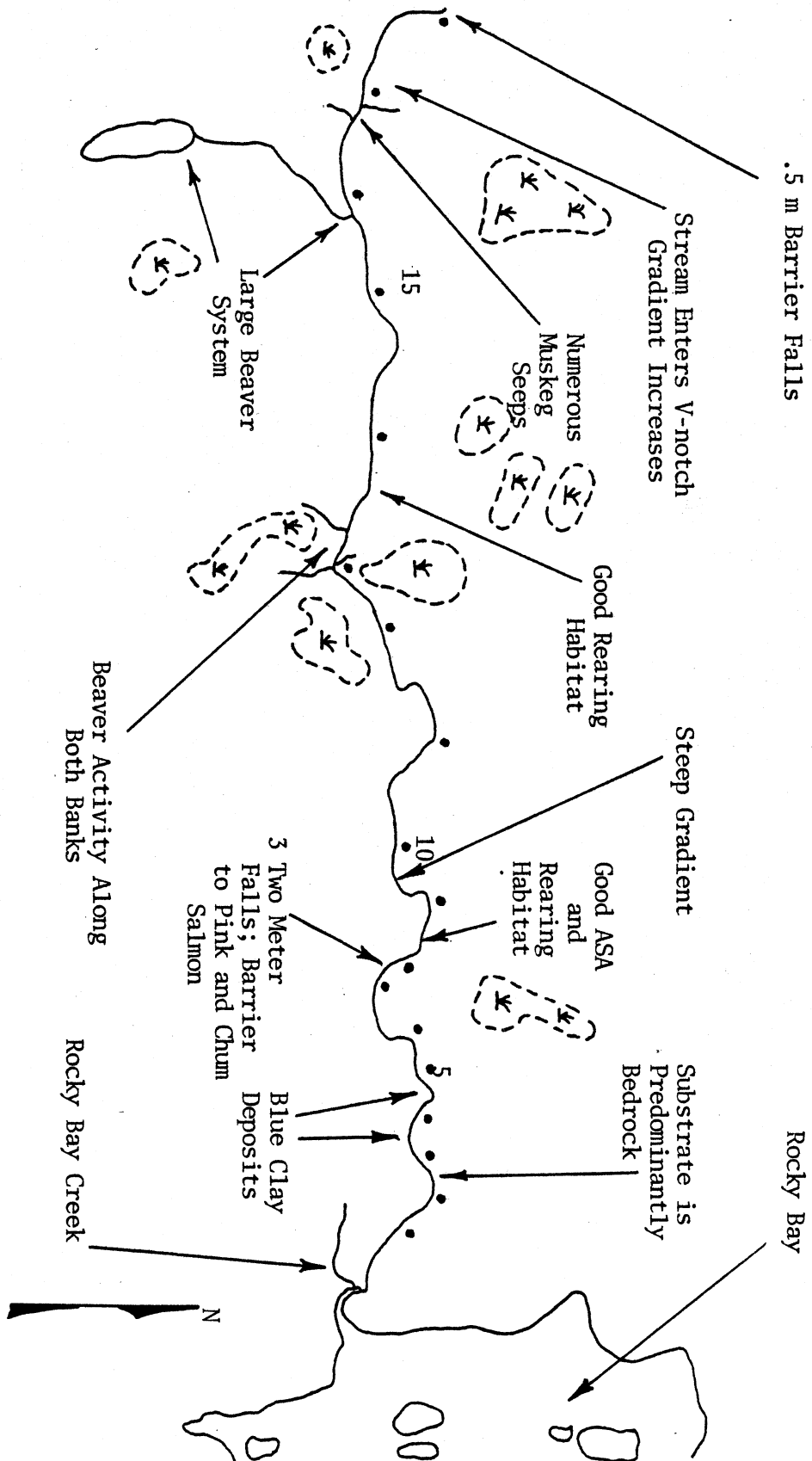
22. Comments

Stream Evaluation

This stream is a known pink, chum and coho salmon producer. Substrate is generally rounded cobble and gravel with interspersed bedrock outcroppings. A series of 3 two meter falls are a potential barrier to pink and chum salmon, 790 m up from the ITZ. This barrier makes 2200 m of stream (416.9m² of ASA) inaccessible to those species. Coho fry were common above the falls indicating they do utilize this habitat. Overall the stream has low-moderate gradient with isolated steep sections. Rearing habitat is generally good. Beaver activity is moderate on small tributaries along the upper sections.

23. Investigators Randy Ericksen 24. Date 6/22/83

106-30-74



106-30-74



1. The ITZ looking toward the creek mouth.



2. The ITZ looking downstream over Rocky Bay.



3. Section 5: Moderate debris loading and large, deep pools provide good rearing habitat.



4. The third of 3 two meter falls in Section 8. A potential barrier to pink and chum salmon.



5. Section 9: Good fish habitat just above the falls.



6. Section 16: Substrate consists largely of small cobble and gravel. A large bedrock outcrop is visible in the background.



7. A large beaver system enters the left bank of Section 16.



8. A 5 meter barrier falls at the end of Section 18. Survey terminated.

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	5.1	5	25.5					
2	100	3.5	1	3.5					
3	100	3.9	3	11.7					
4	100	2.2	3	6.6					
5	100	3.9	1	3.9					
6	100	4.2	3	12.6					
7	190	5.2	--	--					
8	90	5.8	--	--					
9	140	4.4	5	30.8					
10	100	4.2	--	--					
11	200	7.6	3	45.6					
12	300	4.1	2	24.6					
13	100	7.5	--	--					
14	300	5.1	5	76.5					
15	300	5.4	7	113.4					
16	200	4.2	5	42					
17	300	4.0	7	84					
18	260	3.0	--	--					
Total				480.7m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name n/a 2. ADF&G Catalog No. 106-30-74

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	190
3. Compass Bearing	310	340	330	320	200	260	260
4. Gradient	2.5	3.0	1.5	1.0	1.0	1.5	2.0
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	B	B	A	A/D	A	B	B
7. Bank Stability	1/1	1/1	1/1	3/3	1/1	1/1	1/1
8. Bank Vegetation	1,3,4	1,3,4	1,3,4	1,3,4	1,3,4	1,3,4	1,3,4
9. Debris Loading	3	4	1	5	3	5	5
10. Undercut Bank Length	--	--	5	60	5	10	--
11. Stream Width:							
Channel	5.1	5.4	7.4	8.0	11.6	8.6	6.5
Water	5.1	3.5	3.9	2.2	3.9	4.2	5.2
12. Water Type %:							
SS	30	40	60	65	35	35	40
DS	5	--	--	--	50	15	20
SF	65	60	40	35	15	50	40
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	15	45	10	5	10	10	15
Boulder	5	5	10	5	5	5	25
Large Cobble	30	10	30	10	5	5	20
Small Cobble	10	15	20	45	35	40	25
Gravel	40	25	30	30	40	40	15
Sand	--	--	--	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	5/clay	5/clay	--	--
14. ASA %/Quality	5/3	1/3	3/2	3/2	1/2	3/2	--
15. Rearing Area %	45	30	40	50	80	50	30
16. Pool Cover %	5	1	1	10	3	2	--
17. Riffle Cover %	3	1	1	4	10	3	1
18. Fish Observed	SS	SS	SS	SS	SS	SS	SS
	CT	CT	CT	CT	CT	CT	CT
	DV	DV	DV	DV	DV	DV	DV
19. Sampling	N	N	Y	N	Y	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: Numerous bedrock outcroppings. Coho fry are abundant. Deer sign is prolific.
 Section 2: Bedrock is the dominant substrate.
 Section 3: Gradient decrease. Increase in small cobble and gravel substrate. Bear observed.
 Section 4: Blue clay deposits along banks. Some channel braiding occurs.
 Section 5: Continue blue clay deposits. Excellent rearing habitat.

22. Investigators Randy Ericksen Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name n/a 2. ADF&G Catalog No. 106-30-74

Reach Number	2	2	2	2	2	2	2
1. Section Number	8	9	10	11	12	13	14
2. Section Length	90	140	100	200	300	100	300
3. Compass Bearing	210	270	340	290	270	260	250
4. Gradient	18.0	1.5	6.0	2.0	3.0	4.5	2.0
5. Water Quality	3	3	3	3	3	3	4
6. Bank Type	B	B	B	B/D	B/C	B	B/C
7. Bank Stability	1/1	1/1	1/1	3/3	1/1	1/1	1/1
8. Bank Vegetation	1,3,4	1,3,4	1,3,4	1,3,4	1,3-5	1,3,4	1,3-5
9. Debris Loading	--	1	1	2	1	2	2
10. Undercut Bank Length	--	--	--	40	10	--	40
11. Stream Width:							
Channel	6.1	7.8	6.0	7.6	7.0	8.2	7.4
Water	5.8	4.4	4.2	7.6	4.1	7.5	5.1
12. Water Type %:							
SS	10	40	40	60	35	40	40
DS	30	--	10	--	--	--	10
SF	50	60	50	40	65	60	50
DF	10	--	--	--	--	--	--
13. Substrate %:							
Bedrock	40	25	40	25	35	45	35
Boulder	30	20	20	15	10	15	5
Large Cobble	10	20	20	5	10	10	10
Small Cobble	10	20	10	35	35	20	30
Gravel	10	15	10	15	10	10	20
Sand	--	--	--	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	5/C	--	--	--
14. ASA %/Quality	--	5/2	--	3/2	2/2	--	5/2
15. Rearing Area %	--	40	10	30	10	5	30
16. Pool Cover %	--	--	--	--	--	--	--
17. Riffle Cover %	--	2	--	1	1	1	--
18. Fish Observed	CT	CT	CT	CT	CT	CT	CT
		SS	SS	SS	SS	SS	SS
		DV	DV	DV	DV	DV	DV
19. Sampling	N	N	N	N	Y	N	N
20. Potential Barriers	2	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 8: Substrate is predominantly bedrock. Gradient is very steep as the stream travels through a V-notch. A series of 3 two meter falls probably block migration of adult pink and chum salmon upstream. Coho fry were found above this section.

Section 9: Low gradient. Good rearing habitat.

Section 10: Steep gradient. Numerous bedrock outcroppings.

Section 11: Low gradient. Good pool/riffle ratio.

Section 14: Beaver activity along both banks. Water color becomes a dark tan. Good rearing habitat. Several 200 mm+ cutthroat trout were seen.

22. Investigators Randy Ericksen Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name n/a 2. ADF&G Catalog No. 106-30-74

Reach Number	2	2	2	3			
1. Section Number	15	16	17	18			
2. Section Length	300	200	300	260			
3. Compass Bearing	230	310	320	220			
4. Gradient	1.0	1.0	1.0	5.5			
5. Water Quality	4	4	4	4			
6. Bank Type	C	C	B	B			
7. Bank Stability	1/1	1/1	1/1	1/1			
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3,4			
9. Debris Loading	3	5	5	5			
10. Undercut Bank Length	300	100	100	5			
11. Stream Width:							
Channel	5.4	7.7	4.0	3.0			
Water	5.4	4.2	4.0	3.0			
12. Water Type %: SS	40	40	40	40			
DS	10	15	--	10			
SF	50	45	60	50			
DF	--	--	--	--			
13. Substrate %:							
Bedrock	10	15	15	45			
Boulder	5	5	10	20			
Large Cobble	5	10	10	20			
Small Cobble	50	45	40	10			
Gravel	25	20	25	5			
Sand	--	--	--	--			
Muck	--	--	--	--			
Other	5/C	5/C	--	--			
14. ASA %/Quality	7/2	5/2	7/2	--			
15. Rearing Area %	40	30	10	2			
16. Pool Cover %	2	5	--	--			
17. Riffle Cover %	5	5	5	10			
18. Fish Observed	CT	CT	CT	CT			
	SS	SS	SS				
19. Sampling	N	N	N	N			
20. Potential Barriers	N	N	N	2			
21. Enhancement/Rehab	N	N	N	N			

Section 16: A large beaver system enters the left bank at 160 m (pH - 6.0, H₂O temperature - 15.0°C). This system originates at a small muskeg pond. Good rearing but no ASA.

Section 17: Numerous muskeg seeps enter the stream.

Section 18: Increased gradient. The stream cuts a sharp V-notch through bedrock. Survey terminated at a 5 m barrier falls.

22. Investigators Randy Ericksen Date 6/22/83

FISH SAMPLING FORM

Stream Name n/a ADF&G Catalog No. 106-30-74 Date 6/22/83

Identify Survey Area A Water Temp. 12.5°C Bait Used Liverworst

Trap	Time In	Time Out	Species	Length	Comments
1	1100	1635	CT - 3 SS - 1		Section 3
2	1140	1625	CT - 2 SS - 5 DV - 2		Section 5
3	1255	1605	CT - 1 SS - 1 DV - 3		Section 12

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

106-30-74

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
8-26-68	200			
9-13-70	1000			
8-31-71	1500	75		
8-30-72	2006			
9-1-76	400			
8-28-78	3300			
8-13-79	120			
8-21-80	50			
8-17-81	300			
10-5-82	803	4	Coho - 15	

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas none 2. Section Length n/a
 3. Historical Fish Species no escapement data available

Part II.

1. Stream Name Rocky Bay Creek 2. ADF&G Catalog No. none
 3. Latitude 56°03'05" Longitude 133°06'09"
 4. Agency Unit 05 5. Mgmt. Area 551 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 8-26-79 12 24 610050 579-206
 8. Bay/Drainage Rocky Bay 9. Access 2
 10. Present Land Use none
 11. Historical Land Use none
 12. Stream Origin 5 13. Estimated Flow 2 cfs 14. Flow Stage 2
 15. Stream Temperature 16°C 16. pH 6.5 17. Beaver none
 18. Temperature Sensitivity yes; small stream
 19. Barrier none surveyed 20. Weather 2

Part III.

21. Intertidal - shares ITZ with 106-30-74
 A. Substrate: Fines 0 % Gravel/S. Cob. 5 %
 L. Cob/Boulder/Bedrock 95 %
 B. Gradient 3.0 %
 C. ASA % 2, fair
 D. Schooling no
 E. Shellfish no
 F. Anchorage Whale Pass

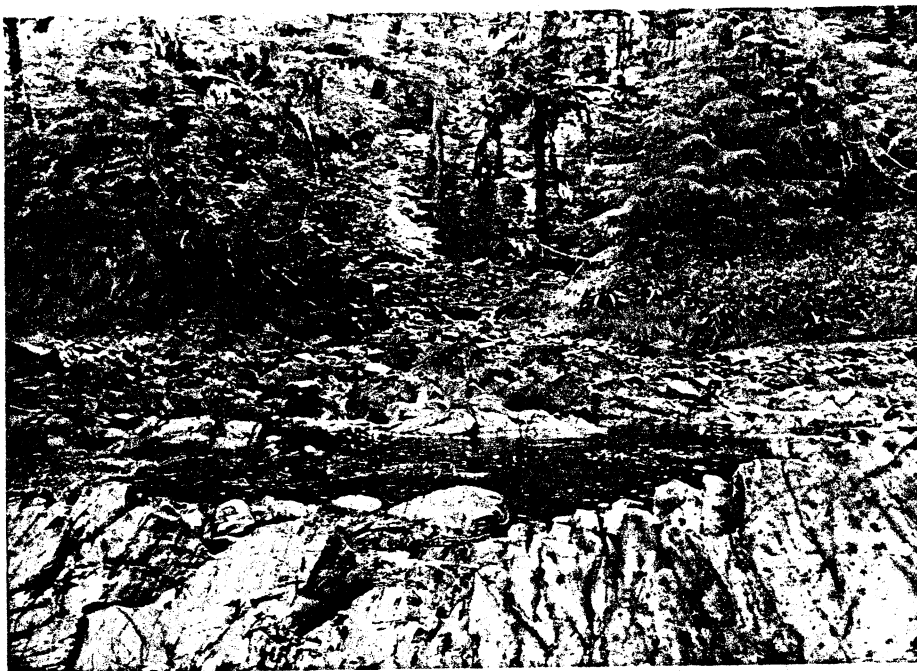
22. Comments

Stream Evaluation

This small stream shares the intertidal zone with 106-30-74. Substrate consists mostly of large cobble, boulders and bedrock. The stream travels for 100 m at 5% gradient before abruptly changing to 10%. ASA comprises about 2% of the stream area. Coho fry were present but not common.

23. Investigators Randy Ericksen 24. Date 6/22/83

Rocky Bay Creek



1. Looking over the ITZ of 106-30-74 to the ITZ and stream mouth.



2. Substrate consists largely of large cobble, boulder and bedrock.

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A 2. Section Length 100 m
 3. Historical Fish Species PS

Part II.

1. Stream Name West of Mabel Creek 2. ADF&G Catalog No. 106-30-73
 3. Latitude 56°02'03" Longitude 132°04'14"
 4. Agency Unit 05 5. Mgmt. Area 553K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-25-579-120/121
 8. Bay/Drainage Whale Pass 9. Access 2
 10. Present Land Use none
 11. Historical Land Use 20+ year clearcut along both banks near ITZ.
 12. Stream Origin 3, 4, 5, 6 13. Estimated Flow 1.5 cfs 14. Flow Stage 2
 15. Stream Temperature 17.5°C 16. pH 6.3 17. Beaver no
 18. Temperature Sensitivity yes; low flow, numerous seeps and muskeg source
 19. Barrier Potential low flow/velocity 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines -- % Gravel/S. Cob. 15 %
 L. Cob/Boulder/Bedrock 85 %
 B. Gradient 3.5 % (high tide)
 C. ASA % --
 D. Schooling Whale Pass and Mabel Bight
 E. Shellfish Moderate throughout Whale Pass
 F. Anchorage Whale Pass

22. Comments

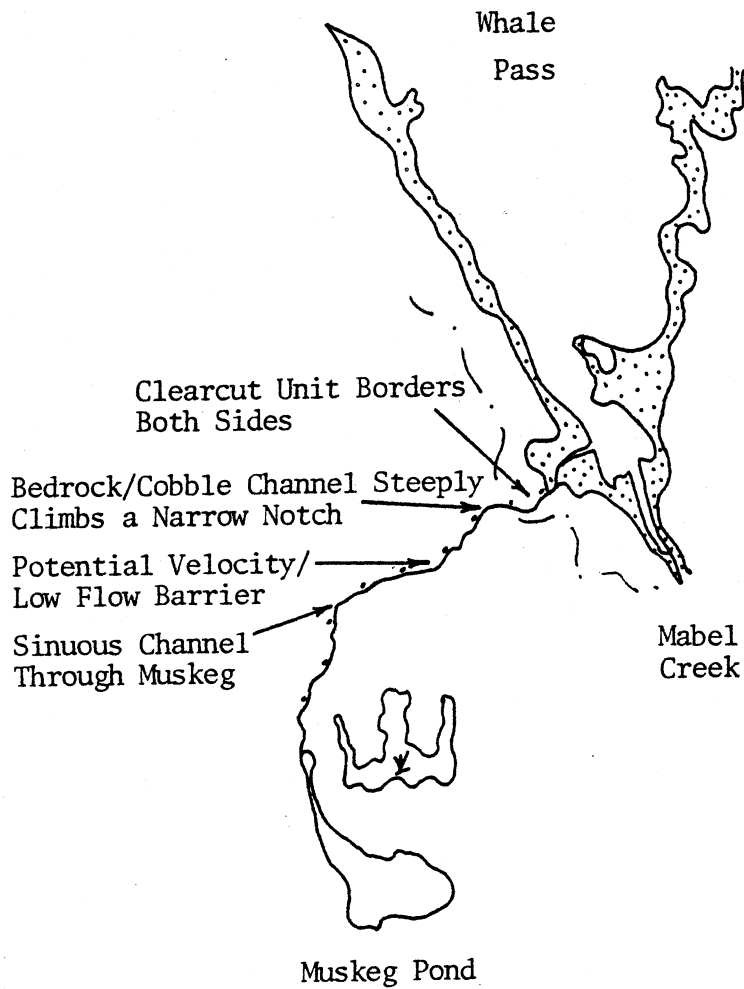
Stream Evaluation

Entering the ITZ just west of Mabel Creek (106-30-72), this small steep stream is characterized by sinuous, muskeg drained headwaters (i.e. Reach 2) and a deeply incised bedrock/boulder channel flowing to the tidal zone (i.e. Reach 1). One "patch" of ASA was observed in Section 1 and rearing habitat was limited to peripheral pools throughout the course of the survey. Approximately 40 SS fry were observed, however, habitat is definitely limited. A beach accessed clearcut extends to both banks of the ITZ. No rehabilitation or enhancement recommended.

23. Investigators Ted Mickowski 24. Date 6/23/83

106-30-73

N



Prince of Wales Island

West of Mabel Creek
106-30-73

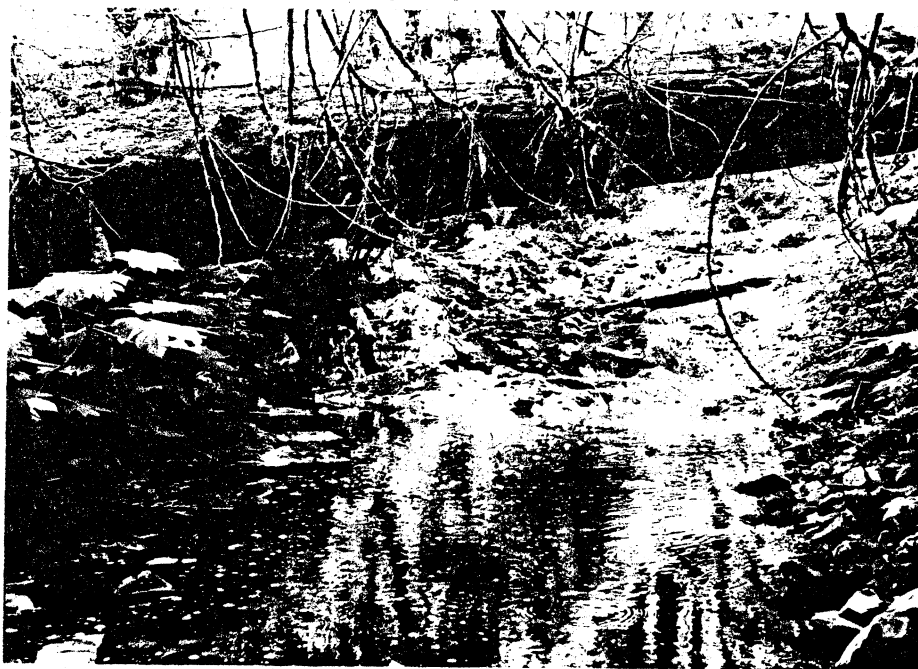


1. Interface of the boulder strewn upper ITZ and a small tidal lagoon.



2. The upper ITZ is characterized by bedrock chutes and boulder riffles. A clearcut unit extends to both banks.

West of Mabel Creek
106-30-73



3. Bedrock cascades, logging debris and pools containing angular cobble provide limited rearing and marginal isolated spawning.



4. Bedrock/boulder cascades characterize section. Fisheries habitat limited to isolated rearing in peripheral pools.

West of Mabel Creek
106-30-73



5. Bedrock cascades located at the junction of Section 3 and Section 4 represent a potential low flow/velocity migration barrier.



6. Steep channel gradients, lack of ASA, and marginal isolated rearing negated additional surveying.

106-30-73

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	3.3	1	3.3m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West of Mabel Creek 2. ADF&G Catalog No. 106-30-73

Reach Number	1	1	1	1	2	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	208	271	253	229	157	225	227
4. Gradient	7	7	7	6	4	2.5	2.5
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	B	B	B	B	C	C	C
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	6	7	4	--	--	2	4
10. Undercut Bank Length	--	--	--	--	--	--	--
11. Stream Width:							
Channel	4.5	5.5	2.7	5.5	4.2	4.5	3.3
Water	3.3	3.0	2.7	3.9	4.2	3.6	2.1
12. Water Type %: SS	30	20	25	10	20	20	35
DS	5	5	--	5	5	5	5
SF	65	75	75	85	75	75	60
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	25	30	40	70	30	40	20
Boulder	15	15	25	18	25	20	20
Large Cobble	35	30	20	7	35	15	25
Small Cobble	15	15	10	3	5	20	25
Gravel	10	10	5	2	5	5	10
Sand	--	--	--	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	1/2	--	--	--	--	--	--
15. Rearing Area %	15	10	5	5	2	5	10
16. Pool Cover %	15	5	5	--	5	5	10
17. Riffle Cover %	5	5	5	--	5	5	10
18. Fish Observed (fry) SS	<12	<12	<6	--	6	1	<12
19. Sampling	N	N	N	N	Y	N	N
20. Potential Barriers	N	N	Y	Y	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

ITZ: Survey was performed near high tide. A bedrock cascade delineates the upper extent of the ITZ and fractured bedrock/boulders typify that portion of the ITZ visible at time of survey. 12 SS fry were observed rearing in peripheral bedrock pools. An extensive, revegetated clearcut extends to both banks (Photo 1 and 2).

Section 1: Bedrock cascades, logging debris, and pools containing angular cobble provide limited rearing and marginal, isolated spawning (Photo 3). A muskeg seep enters channel via the left bank.

22. Investigators Ted Mickowski Date 6/23/83

LEVEL TWO HABITAT SURVEY

- Section 2: Bedrock/cobble channel steeply climbs a narrow notch, providing marginal rearing in peripheral pools. Scrubby old growth, principally cedar, lines both banks.
- Section 3: Bedrock/boulder cascades characterize section. Fisheries habitat is limited to isolated rearing in peripheral pools (Photo 4).
- Section 4: Bedrock cascades located at the junction of Section 3 and Section 4 represent a potential low flow/velocity barrier (Photo 5).
- Section 4: 55m; A 1.0 m high bedrock cascade, immediately followed by a 11.0 m long high velocity bedrock chute, represents a potential low flow/velocity barrier. Aquatic moss and algae were abundant throughout section.
- Section 5-7: Substrate remains a matrix of bedrock, boulder and cobble, however, gradients are reduced as the channel adopts a sinuous course through scrub covered muskeg, demarcating Reach 2.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name West of Mabel Creek 2. ADF&G Catalog No. 106-30-73

Reach Number	2						
1. Section Number	8						
2. Section Length	100						
3. Compass Bearing	184						
4. Gradient	4						
5. Water Quality	3						
6. Bank Type	C						
7. Bank Stability	1/1						
8. Bank Vegetation	1,3-5						
9. Debris Loading	3						
10. Undercut Bank Length	5						
11. Stream Width:							
Channel	4.5						
Water	3						
12. Water Type %: SS	30						
DS	5						
SF	65						
DF	--						
13. Substrate %:							
Bedrock	35						
Boulder	20						
Large Cobble	20						
Small Cobble	15						
Gravel	10						
Sand	--						
Muck	--						
Other	--						
14. ASA %/Quality	--						
15. Rearing Area %	2						
16. Pool Cover %	10						
17. Riffle Cover %	5						
18. Fish Observed (fry) SS	1						
19. Sampling	N						
20. Potential Barriers	N						
21. Enhancement/Rehab	N						

Section 8: Steep channel gradients, lack of ASA, and marginal isolated rearing negated additional surveying (Photo 6).

22. Investigators Ted Mickowski Date 6/23/83

FISH SAMPLING FORM

Stream Name West of Mabel Creek ADF&G Catalog No. 106-30-73 Date 6/23/83

Identify Survey Area A Water Temp. 17.5°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1440	1640	CO - 3		Set in ITZ
2	1530	1620	SS - 2		Section 5

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

106-30-73

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
9/13/70	2,000			Aerial IT surveys
8/22/73	1,000			
8/12/80	60			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A & B 2. Section Length 100 m
 3. Historical Fish Species PS & CS

Part II.

1. Stream Name Mabel Creek 2. ADF&G Catalog No. 106-30-72
 3. Latitude 56°01'56" Longitude 133°03'58"
 4. Agency Unit 05 5. Mgmt. Area 553 K 6. USGS Map No. Petersburg A-4
 7. Aerial Photo No. 79-25-579-120/121 79-26-579-76/77
 8. Bay/Drainage Whale Pass 9. Access 2
 10. Present Land Use none
 11. Historical Land Use 20+ year clearcut extends to bank of lower ITZ
 12. Stream Origin 1, 3, 4, 5, 6 13. Estimated Flow 15 cfs 14. Flow Stage 2.5
 15. Stream Temperature 14.5°C 16. pH 6.5 17. Beaver
 18. Temperature Sensitivity yes; lake source and muskeg seeps
 19. Barrier yes; 4.0 & 12.0 meter high falls 20. Weather 2

Part III.

21. Intertidal

- A. Substrate: Fines 10 % Gravel/S. Cob. 50 %
 L. Cob/Boulder/Bedrock 40 %
 B. Gradient 1.5 %
 C. ASA % 15/good
 D. Schooling Whale Pass and Mabel Bight
 E. Shellfish none observed
 F. Anchorage Whale Pass

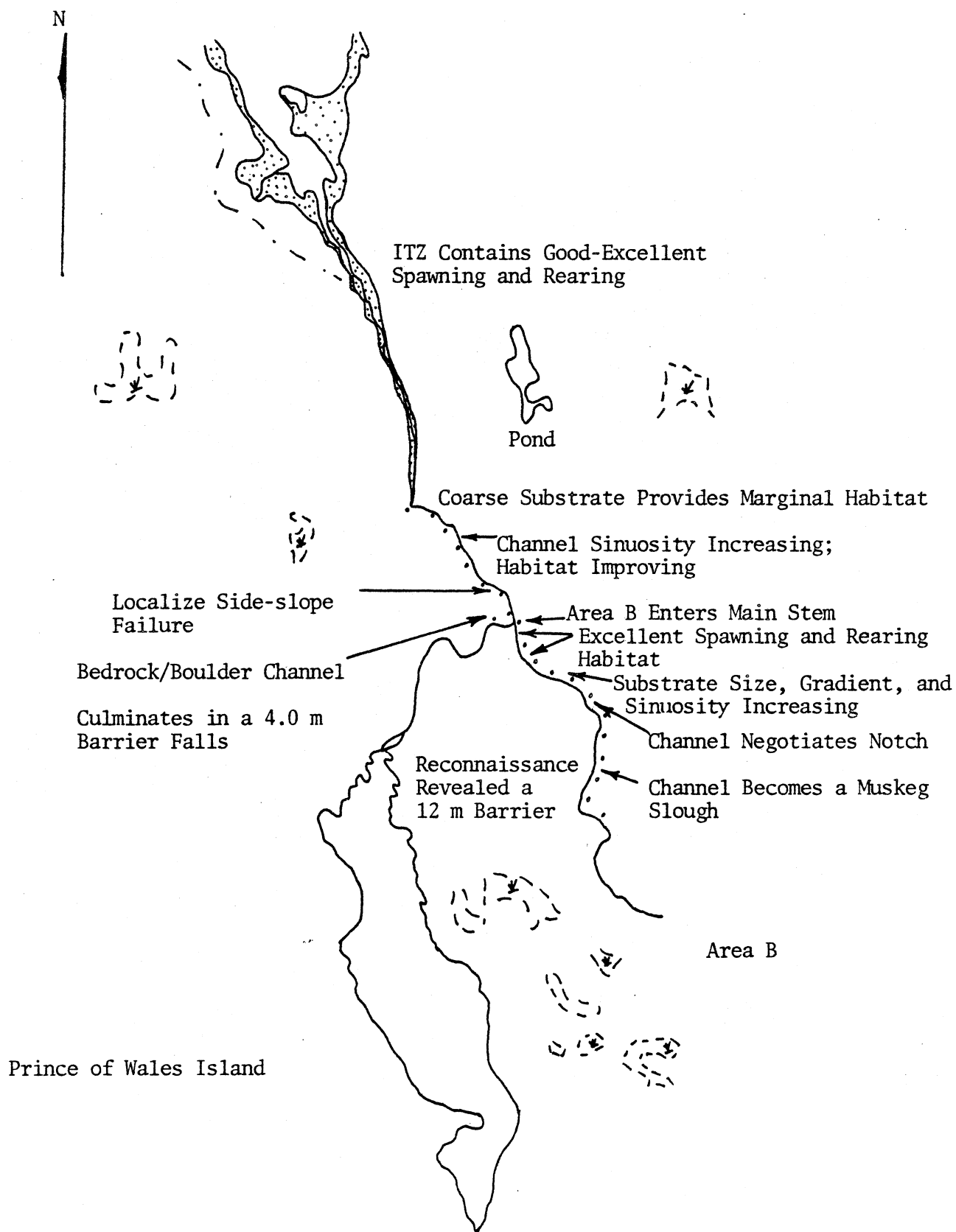
22. Comments

The intertidal zone evaluation extends from the interface of old growth timber and a clearcut unit along the left bank to a sharp bend, approximately 500 m upstream. Dark water and instream moss hindered observations; however, copious blowdown, peripheral pools, and gravel riffles provide abundant rearing and spawning habitat.

This moderately sized stream sustains strong pink and incidental chum salmon runs within its extensive ITZ. Above the ITZ main stem "production" is limited by coarse substrate and several barrier falls occurring 790 and 834 meters above the ITZ. Localized side slope failures are common throughout Area A. A 2.5 cfs tributary, Survey Area "B", provides good-excellent rearing and spawning habitat before culminating in a narrow, sinuous "muskeg slough". Moderate numbers of rearing silver salmon fry were observed throughout the survey. No rehabilitation or enhancement recommended.

23. Ted Mickowski Date 6/22/83

106-30-72



Mabel Creek
106-30-72



1. View down lower ITZ toward Whale Pass. An extensive revegetated clearcut extends along a portion of the right bank.



2. View up mid ITZ. Old growth timber lines both banks.

Mabel Creek
106-30-72



3. Section 3: Cobble riffles provide moderate spawning habitat. Abundant instream moss and skunk cabbage attest to typically low, stable summer flows.

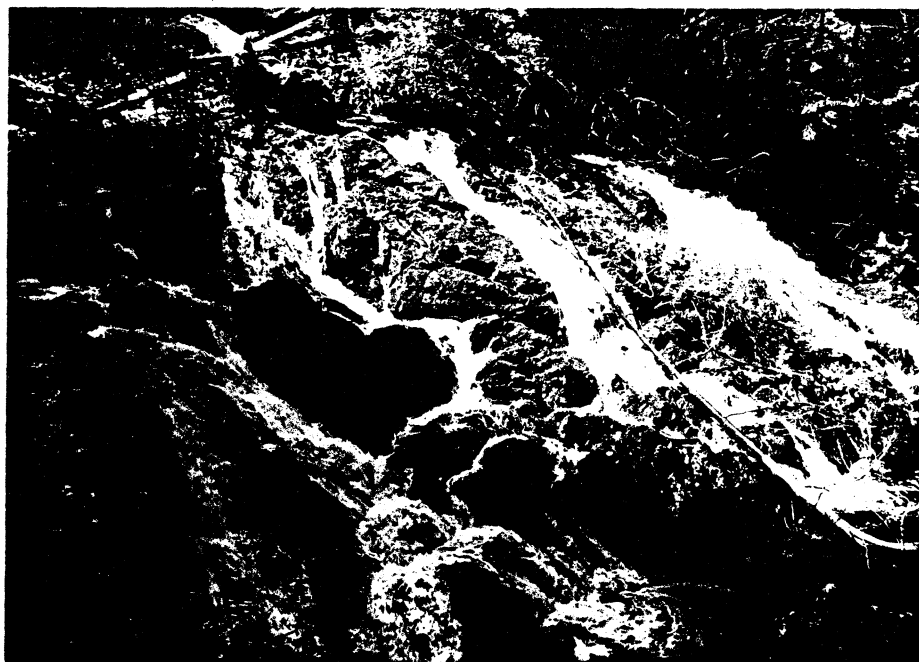


4. Section 1: A 4.0 vertical meter bedrock falls represents a height and velocity barrier. A debris jam demarcates the extent of an extensive "mid-channel" bedrock outcrop.

Mabel Creek
106-30-72



5. View beyond survey reveals a second barrier falls 12 vertical meters in height.



6. Thirty-four meters beyond Section 8, a second falls plummets 12 vertical meters to a bedrock/ boulder cascade.

Mabel Creek
106-30-72
Area "B"



1. Section 1: Gravel riffles, debris pools, undercut banks, and copious overhanging vegetation provide excellent spawning and rearing habitat.



2. Section 4: Reach 2 is characterized by increasing sinuosity, gradient and the incidence of large cobble and boulders.

Mabel Creek
106-30-72
Area "B"



3. Section 9: Increasing sinuosity and undercut banks, reduced gradients, instream skunk cabbage, and "muskeg banks" typify Reach 3.



4. Reconnaissance: Narrow, sinuous seep fed channel provides rearing habitat in the form of dark, debris pools. Spawning substrate was isolated.

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
Area "A"									
3	100	10	10	100					
4	100	13.5	15	202.5					
6	100	11.2	3	33.6					
7	100	12	3	36					
Total				372.1m ²					
Area "B"									
1	100	3.7	25	92.5					
2	100	4.3	2	8.6					
7	100	3.9	10	39					
8	100	2.9	15	43.5					
9	100	3.1	15	46.5					
10	100	2.5	15	37.5					
Total				267.6m ²					
Total ASA				639.7m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Mabel Creek 2. ADF&G Catalog No. 106-30-72

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	184	194	129	151	174	117	159
4. Gradient	1.5	2.5	2	2	1.5	2	1.5
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	B	B	B/A	B/A	B/A	B/A	B/A
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	3	3	6	1	6	4	4
10. Undercut Bank Length	--	--	--	--	--	--	--
11. Stream Width:							
Channel	20.5	10.5	10	13.5	14.2	11.2	12
Water	11.2	8.2	10	13.5	14.2	11.2	12
12. Water Type %: SS	35	15	25	25	40	25	15
DS	25	--	5	5	10	10	15
SF	40	70	60	65	45	60	50
DF	--	15	10	5	5	5	20
13. Substrate %:							
Bedrock	5	15	5	--	--	3	--
Boulder	20	33	15	10	15	10	15
Large Cobble	30	25	30	30	30	37	35
Small Cobble	25	15	30	30	35	30	30
Gravel	20	10	15	25	20	20	20
Sand	5	2	5	5	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	--	--	10/3	15/3	--	3/3	3/3
15. Rearing Area %	20	7	15	15	15	15	15
16. Pool Cover %	12	12	15	20	15	30	15
17. Riffle Cover %	10	10	10	10	10	10	10
18. Fish Observed (fry) SS	>12	<12	>12	>25	>25	>12	--
19. Sampling	N	N	Y	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	NN	N

Sections 1&2: Survey begins amidst a boulder/cobble dominated "dogleg" bend. No spawning habitat observed, and rearing is limited to peripheral substrate induced pools.

Section 3: Abundant instream moss and skunk cabbage attest to typically low, stable summer flows. Overhanging shrubs and debris provide moderate cover. Cobble riffles provide moderate spawning habitat (photo 3). Channel sinuosity increasing.

22. Investigators Ted Mickowski Date 6/22/83

LEVEL TWO HABITAT SURVEY

- Section 4: 50m; Less than 1.0 cfs muskeg drainage enters channel via the left bank. No fish or habitat observed.
- Section 5: Isolated blowdown along right bank.
- Section 6: Localized sideslope failure along left bank.
- Section 7: 0-68m; Channel diverges around brush-covered island.
45m; Survey Area "B" enters the main stem via the left bank.
- Section 8: Bedrock/boulder channel diverges around a large bedrock outcrop "headed" by an extensive logjam and culminates in a 4.0 vertical meter barrier falls (photo 4).

Reconnaissance

Lack of main stem habitat and the aforementioned barrier negated additional surveying. A reconnaissance, however, was conducted to the headwater lake, a distance of approximately 700 m. Thirty-four meters beyond Section 8 (i.e., 834 m above ITZ), a second falls plummets 12 vertical meters to a bedrock/boulder channel. Channel gradients beyond this impass moderate to a mean 2%. Several moderate deposits of ASA were observed although bedrock, boulders, and large cobble characterized channel substrate. Rearing area was isolated and no fish were observed. No enhancement or rehabilitation is recommended.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Mabel Creek 2. ADF&G Catalog No. 106-30-72

Reach Number	1						
1. Section Number	8						
2. Section Length	100						
3. Compass Bearing	246						
4. Gradient	>10						
5. Water Quality	3						
6. Bank Type	B						
7. Bank Stability	1/1						
8. Bank Vegetation	1,3-5						
9. Debris Loading	8						
10. Undercut Bank Length	--						
11. Stream Width:							
Channel	10.9						
Water	10.9						
12. Water Type %:							
SS	5						
DS	15						
SF	50						
DF	30						
13. Substrate %:							
Bedrock	40						
Boulder	20						
Large Cobble	20						
Small Cobble	15						
Gravel	5						
Sand	--						
Muck	--						
Other	--						
14. ASA %/Quality	--						
15. Rearing Area %	3						
16. Pool Cover %	40						
17. Riffle Cover %	10						
18. Fish Observed	--						
19. Sampling	N						
20. Potential Barriers	Y						
21. Enhancement/Rehab	N						

For comments, see previous page.

22. Investigators Ted Mickowski Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Mabel Creek 2. ADF&G Catalog No. 106-30-72
Area "B"

Reach Number	1	1	2	2	2	2	2
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	189	124	93	39	124	66	09
4. Gradient	2	3	2.5	4	7	4	3
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	A/B	A/B	A/B	B	B	B	B
7. Bank Stability	1/1	1/1	1/1	1/1	1/1	1/1	1/1
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	10	8	6	6	3	15	4
10. Undercut Bank Length	35	--	15	--	--	--	35
11. Stream Width:							
Channel	3.7	4.3	6.5	4.3	10.4	3.5	3.9
Water	3.7	4.3	2	4.3	3.0	3.5	3.9
12. Water Type %:							
SS	40	30	30	10	10	20	35
DS	10	10	5	--	--	--	--
SF	50	60	65	90	90	80	65
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	--	--	30	--	--
Boulder	--	8	13	25	25	15	15
Large Cobble	18	30	35	35	20	35	25
Small Cobble	50	30	25	25	15	30	35
Gravel	30	30	25	15	10	20	25
Sand	2	2	2	--	--	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	25/3	2/3	--	--	--	--	10/3
15. Rearing Area %	30	15	15	3	5	10	20
16. Pool Cover %	20	12	20	10	10	15	15
17. Riffle Cover %	5	8	10	10	10	15	10
18. Fish Observed (fry) SS	>25	>12	>12	1	<6	<12	>12
19. Sampling	Y	N	Y	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Survey Area "B" enters the main stem, Section 7: 45m, via the left bank. Flow was estimated at 2.5 cfs, pH and water temperature were 5.5 and 14.5°C respectively.

Section 1: Gravel riffles, debris pools, undercut banks and copious overhanging vegetation provide excellent spawning and rearing habitat (Reach 1). Instream skunk cabbage attests to typically low summer flow. A 1 cfs muskeg drainage enters the channel via the right bank, providing limited rearing near the confluence.

22. Investigators Ted Mickowski Date 6/22/83

LEVEL TWO HABITAT SURVEY

- Section 3: Increasing sinuosity and gradient, and the incidence of large cobble and boulders demarcate Reach 2. Instream skunk cabbage and rearing SS fry remain common.
- Section 4: Channel diverges around a 5.4 m wide bar before negotiating a notch.
- Section 7: 37m; Muskeg seep, left.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Mabel Creek 2. ADF&G Catalog No. 106-30-72
Area "B"

Reach Number	2	3	3	3			
1. Section Number	8	9	10	11			
2. Section Length	100	100	100	100			
3. Compass Bearing	107	87	99	153			
4. Gradient	2	1.5	1.5	1.5			
5. Water Quality	3	3	3	3			
6. Bank Type	C	C	C	C			
7. Bank Stability	1/1	1/1	1/1	1/2			
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5			
9. Debris Loading	5	3	4	4			
10. Undercut Bank Length	30	20	35	75			
11. Stream Width:							
Channel	2.9	3.1	2.5	3.5			
Water	2.9	3.1	2.5	3.5			
12. Water Type %: SS	45	40	40	40			
DS	5	--	--	--			
SF	50	60	60	60			
DF	--	--	--	--			
13. Substrate %:							
Bedrock	--	3	3	--			
Boulder	5	7	5	--			
Large Cobble	25	20	20	15			
Small Cobble	35	35	35	50			
Gravel	30	35	35	35			
Sand	5	--	2	--			
Muck	--	--	--	--			
Other	--	--	--	--			
14. ASA %/Quality	15/3	15/3	15/3	--			
15. Rearing Area %	20	20	20	15			
16. Pool Cover %	15	15	15	12			
17. Riffle Cover %	5	5	5	3			
18. Fish Observed (fry) SS	>12	>12	<6	<12			
19. Sampling	N	N	N	N			
20. Potential Barriers	N	N	N	N			
21. Enhancement/Rehab	N	N	N	N			

Section 8: Localized instream clay deposits were observed.

75m; A 1 cfs muskeg drainage enters the channel via the right bank.

Section 9: Increasing sinuosity and undercut banks, reduced gradients, instream skunk cabbage, and "muskeg banks" demarcate Reach 3. Cobble riffles, located between SS pools, provide moderate ASA.

22. Investigators Ted Mickowski Date 6/22/83

LEVEL TWO HABITAT SURVEY

Section 11: Substrate becomes angular and compact. Debris loading remains moderate, forming dark pools. Instream skunk cabbage and moss remain common. Lack of spawning substrate and the marginal quality of the rearing habitat negated additional surveying.

Reconnaissance of upper Survey Area "B" reveals a narrow, sinuous, seep fed channel characterized by overhanging banks, dark debris pools, and muskeg "sideslopes". Moderate rearing habitat was seen and spawning substrate was isolated and of marginal quality (photo 4).

FISH SAMPLING FORM

Stream Name Mabel Creek ADF&G Catalog No. 106-30-72 Date 6/22/83

Identify Survey Area A & B Water Temp. 14.5°C Bait Used Liverwort

Trap	Time In	Time Out	Species	Length	Comments
1	1130	1825	SS - 3		Section 3; Area "A"
2	1320	1420	--		Set above barrier during reconnaissance in
3	1320	1420	--		Area "A"
1	1500	1755	SS - 6		Section 1; Area "B"
2	1535	1745	SS - 5 CO - 1		Section 3; Area "B"

This form is used to record fish caught during Level Three, Four, or Five Surveys.

PEAK ESCAPEMENT RECORD

106-30-72

DATE	PINK	CHUM	OTHER SPECIES	REMARKS
10/01/65	1,000			
9/11/66	17,000			
8/26/68	7,000			
8/31/70	5,200			
8/29/71	14,000			
8/18/72	5,000			
8/09/73	400			
9/04/74	1,200			
9/01/76	3,000			
8/10/77	1,100			
8/28/78	4,000			
8/22/79	2,100			
8/12/80	20			
9/22/81	1,445	25		
8/19/82	--	30		
9/20/83	5,600			

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A (Main Stem only) 2. Section Length 100 meters
3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #2 2. ADF&G Catalog No. 106-30-71
3. Latitude 56°02'50" Longitude 133°03'20"
4. Agency Unit 05 5. Mgmt. Area 551K 6. USGS Map No. Petersburg A-4
7. Aerial Photo No. 1979 Photos Fl. Ln. 26 Photo 78
8. Bay/Drainage Whale Pass 9. Access 2
10. Present Land Use None
11. Historical Land Use Area to left of mouth logged 20-30 years ago.
12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 2 cfs 14. Flow Stage 2
15. Stream Temperature 12°C 16. pH 6.3 17. Beaver No
18. Temperature Sensitivity No
19. Barrier No 20. Weather 2

Part III.

21. Intertidal

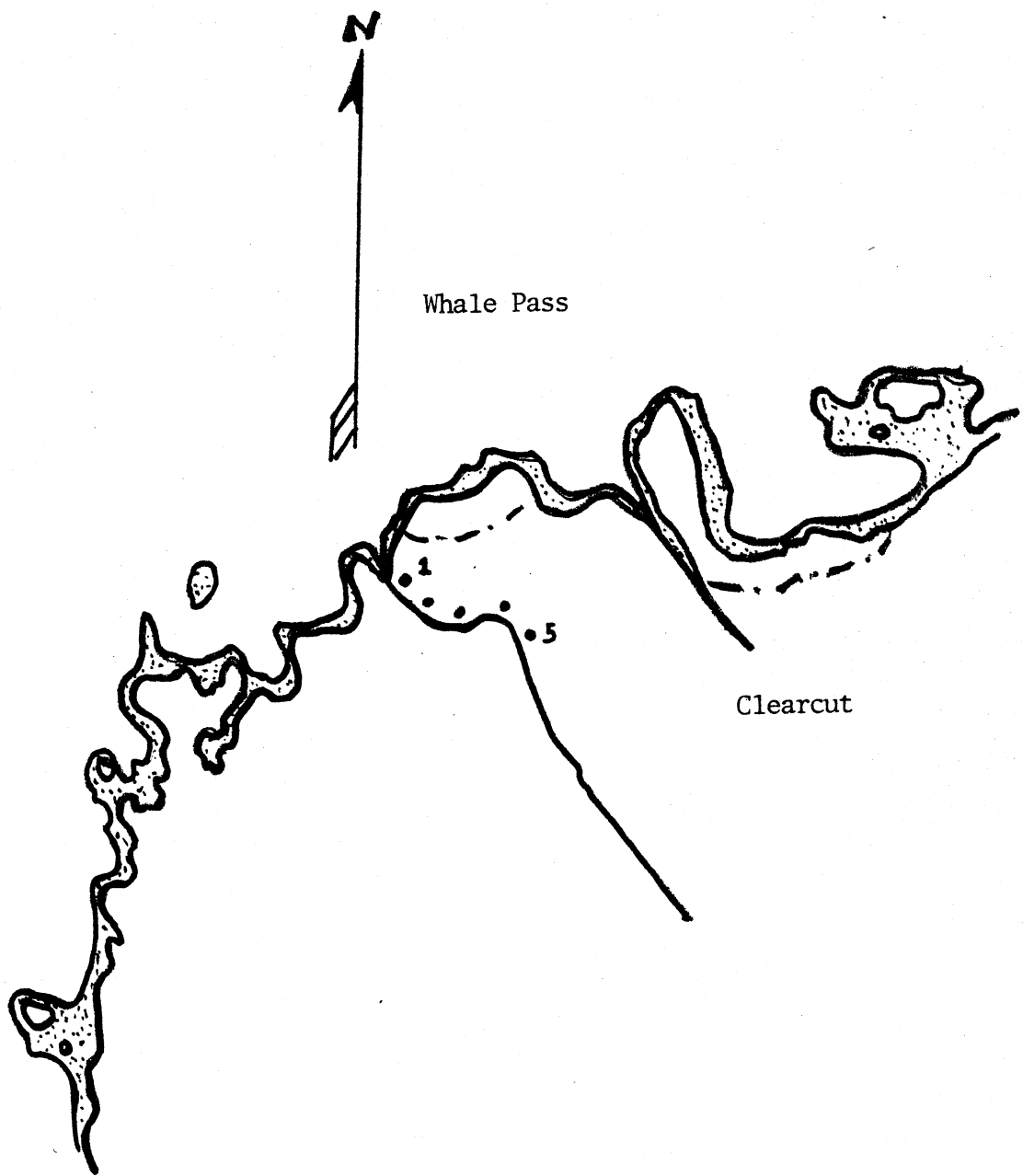
- A. Substrate: Fines 25 % Gravel/S. Cob. 40 %
L. Cob/Boulder/Bedrock 35 %
B. Gradient 4.5 %
C. ASA % --
D. Schooling No, in bay only.
E. Shellfish Present but moderate.
F. Anchorage None

22. Comments

Stream Evaluation

This stream has no ASA and no fish were observed. The majority of the substrate is boulder and coarse with heavy amounts of debris.

23. Investigators Gerry Merrigan 24. Date 6/22/83



106-30-071
Whale Pass #2
Prince of Wales Island

Whale Pass #2
106-30-071

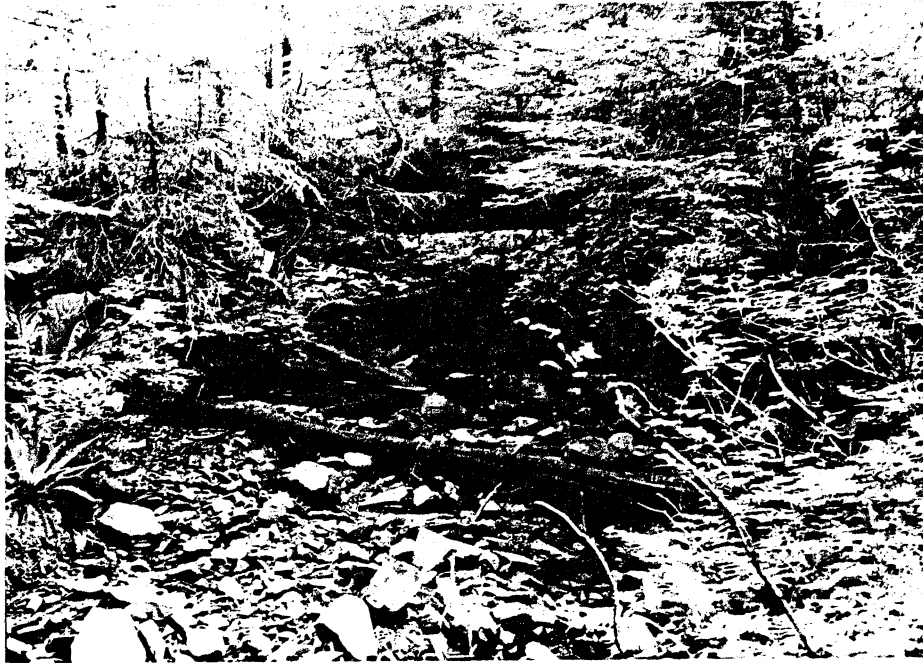


1. Mouth of stream with boulder substrate and debris.



2. Downstream view of lower ITZ toward Whale Pass.

Whale Pass #2
106-30-071



3. Section 3: 0m; Stream flow over boulder/cobble with considerable debris.

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #2 2. ADF&G Catalog No. 106-30-071

Reach Number	1	1	1	1	1		
1. Section Number	1	2	3	4	5		
2. Section Length	100	100	100	100	100		
3. Compass Bearing	160	130	145	185	130		
4. Gradient	4	3.5	3.5	4	5		
5. Water Quality	3	3	3	3	3		
6. Bank Type	B	B	B	B	B		
7. Bank Stability	1(2)	1(2)	1(2)	1(2)	1(2)		
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5		
9. Debris Loading	11	5	6	3	6		
10. Undercut Bank Length	40	60	30	40	30		
11. Stream Width:							
Channel	2.2	1.9	2.0	1.9	2.7		
Water	2.1	1.0	1.0	1.6	1.9		
12. Water Type %: SS	50	50	50	40	20		
DS	10	10	10	10	--		
SF	40	40	40	50	80		
DF	--	--	--	--	--		
13. Substrate %:							
Bedrock	10	10	10	30	30		
Boulder	20	20	20	30	35		
Large Cobble	20	30	30	25	25		
Small Cobble	25	20	25	10	5		
Gravel	20	10	10	5	5		
Sand	5	10	5	--	5		
Muck	--	--	--	--	--		
Other	--	--	--	--	--		
14. ASA %/Quality	--	--	--	--	--		
15. Rearing Area %	35	30	30	15	10		
16. Pool Cover %	20	15	10	30	2		
17. Riffle Cover %	10	5	5	2	2		
18. Fish Observed	--	--	--	--	--		
19. Sampling	N	N	N	N	N		
20. Potential Barriers	N	N	N	N	N		
21. Enhancement/Rehab	N	N	N	N	N		

Section 1: 0m; Boulder/gravel substrate with heavy debris. Forbs in stream.

Section 2: 5m & 70m; Debris jams.

Section 4: 20m; Debris jam.

Section 5: 70m; Debris jam.

100m; Substrate is moss covered boulder at 9% gradient.

22. Investigators Gerry Merrigan Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part I.

1. Survey Areas A (Main Stem only) 2. Section Length 100 meters

3. Historical Fish Species No escapement data available.

Part II.

1. Stream Name Whale Pass #1 2. ADF&G Catalog No. 106-30-070

3. Latitude 56°02'50" Longitude 133°02'45"

4. Agency Unit 05 5. Mgmt. Area 551K 6. USGS Map No. Petersburg A-4

7. Aerial Photo No. 1979 Photos Fl. Ln. 26 Photo 78

8. Bay/Drainage Whale Pass 9. Access 2

10. Present Land Use None

11. Historical Land Use Area left of mouth logged 20-30 years ago.

12. Stream Origin 3, 4, 5, 6 13. Estimated Flow about 3.5 cfs 14. Flow Stage 2

15. Stream Temperature 14° 16. pH 6.3 17. Beaver No

18. Temperature Sensitivity No

19. Barrier No 20. Weather 2

Part III.

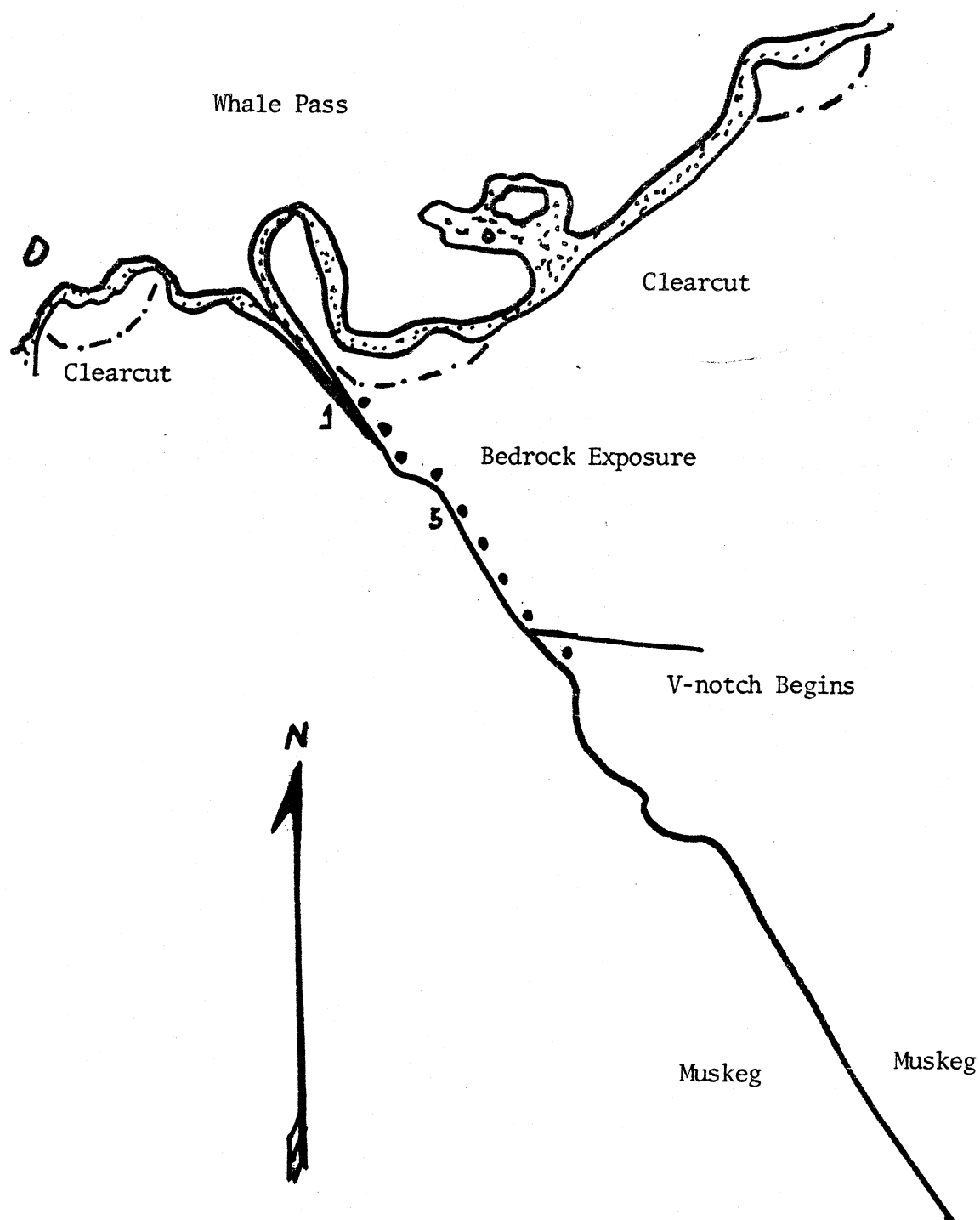
21. Intertidal

- A. Substrate: Fines 30 % Gravel/S. Cob. 35 %
L. Cob/Boulder/Bedrock 35 %
- B. Gradient 3 %
- C. ASA % --
- D. Schooling High tide or in bay.
- E. Shellfish Few present.
- F. Anchorage Skiff only.

22. Comments Stream Evaluation

This stream has low velocity flow over predominantly boulder/cobble substrate with isolated patches of ASA behind instream logs. Only DV trout fry were observed. The streamside banks stay steep, and eventually form a V-notch. Windthrow and debris are common throughout the stream.

23. Investigators Gerry Merrigan 24. Date 6/22/83



106-30-070
Whale Pass #1
Prince of Wales Island

Whale Pass #1
106-30-070



1. Downstream view of ITZ toward Whale Pass.



2. Mouth of Whale Pass #1 with blowdown.

Whale Pass #1
106-30-070



3. Section 2: 40m; Stream flow over boulder/cobble with steep banks and windthrow.

Whale Pass #1

Section	Length (m)	Width (m)	ASA %	ASA Total	Section	Length (m)	Width (m)	ASA %	ASA Total
1	100	2.8	8	22.4					
2	100	2.9	1	2.9					
3	100	1.7	5	8.5					
4	100	2.0	--	--					
5	100	1.9	--	--					
6	100	4.2	5	21.0					
7	100	1.6	--	--					
8	100	2.5	--	--					
9	50	1.2	--	--					
Total				55.8m ²					

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #1 2. ADF&G Catalog No. 106-30-070

Reach Number	1	1	1	1	1	1	1
1. Section Number	1	2	3	4	5	6	7
2. Section Length	100	100	100	100	100	100	100
3. Compass Bearing	130	130	115	135	175	225	130
4. Gradient	2.5	3	3.5	4	4	4	4
5. Water Quality	3	3	3	3	3	3	3
6. Bank Type	B	B	B	B	B	B	B
7. Bank Stability	1(2)	2(2)	1(2)	1(2)	1(2)	1(2)	1(2)
8. Bank Vegetation	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5	1,3-5
9. Debris Loading	16	6	8	8	4	4	5
10. Undercut Bank Length	25	55	25	10	20	30	20
11. Stream Width:							
Channel	4.7	5.8	3.3	6.1	3.4	4.2	2.8
Water	2.8	2.9	1.7	2.0	1.9	4.2	1.6
12. Water Type %: SS	50	35	35	30	30	30	30
DS	20	20	30	15	15	10	10
SF	30	45	35	55	55	60	60
DF	--	--	--	--	--	--	--
13. Substrate %:							
Bedrock	--	--	5	15	10	5	5
Boulder	5	20	20	25	20	25	25
Large Cobble	25	35	20	35	35	35	35
Small Cobble	25	20	25	10	20	25	25
Gravel	35	15	20	10	10	10	10
Sand	10	10	10	5	5	--	--
Muck	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--
14. ASA %/Quality	8/1	5/1	3/1	--	--	5/1	--
15. Rearing Area %	35	20	35	20	25	20	10
16. Pool Cover %	25	10	5	5	10	15	15
17. Riffle Cover %	25	5	10	5	5	5	10
18. Fish Observed (fry)	DV	--	--	DV	--	--	DV
19. Sampling	N	N	N	N	N	N	N
20. Potential Barriers	N	N	N	N	N	N	N
21. Enhancement/Rehab	N	N	N	N	N	N	N

Section 1: 0m; Large quantities of debris.

20m; Heavy blowdown for 30 meters.

Section 2: 55m; Substrate size increasing.

Section 3: 15m; Bedrock outcrop left side for 20 meters.

Section 7: 100m; Tributary left side; insignificant muskeg drain.

22. Investigators Gerry Merrigan Date 6/22/83

LEVEL TWO HABITAT SURVEY

Part IV.

1. Stream Name Whale Pass #1 2. ADF&G Catalog No. 106-30-070

Reach Number	1	1					
1. Section Number	8	9					
2. Section Length	100	50					
3. Compass Bearing	165	150					
4. Gradient	5	6					
5. Water Quality	3	3					
6. Bank Type	B	B					
7. Bank Stability	1(2,3)	1(2,3)					
8. Bank Vegetation	1,3-5	1,3-5					
9. Debris Loading	6	7					
10. Undercut Bank Length	--	--					
11. Stream Width:							
Channel	3.1	8.1					
Water	2.5	1.2					
12. Water Type %: SS	20	20					
DS	10	10					
SF	70	70					
DF	--	--					
13. Substrate %:							
Bedrock	15	20					
Boulder	25	25					
Large Cobble	35	30					
Small Cobble	20	20					
Gravel	5	5					
Sand	--	--					
Muck	--	--					
Other	--	--					
14. ASA %/Quality	--	--					
15. Rearing Area %	10	5					
16. Pool Cover %	5	--					
17. Riffle Cover %	20	20					
18. Fish Observed	--	--					
19. Sampling	N	N					
20. Potential Barriers	N	N					
21. Enhancement/Rehab	N	N					

Section 8: 50m; Steepening banks.

100m; Debris dam.

Section 9: 0m; Enter V-notch.

50m; Gradient increase (10%) over moss covered boulder.

22. Investigators Gerry Merrigan Date 6/22/83

ACKNOWLEDGEMENTS

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Liz Roundtree, Mark Tishman and June Grant.

APPENDIX A

Level II Aquatic Survey Method

AQUATIC SURVEY METHOD

LEVEL TWO surveys are generated by field work and should contain enough information to attempt answers to questions about what fisheries habitat is there and relative amounts of it. There should also be adequate information to determine whether potential enhancement or rehabilitation opportunities exist. The data derived at Level II is generally not statistically reliable within reasonable confidence limits.

Definition of When to Use. Level II surveys are used when general observations are needed about the fishery habitat of a specific stream. Questions like, "Where is the actual streamcourse as compared to habitat?" or even, "Approximately how much spawning area is available?"; can be answered.

How to Use. Mainly, the data is used in situations where a question comes up about an area and the user examines all the data and tries to formulate a general answer. In addition there are some specific figures that can be assimilated out of the data. A partial list of these figures follows:

1. Available spawning area (gravels between 2-128 mm in diameter) contained in the survey area.
2. Amount of the stream that is pool according to our rule that a pool is any section of water flowing at less than 30cm/sec.
3. Amount of debris in the survey area.
4. Water temperature data may be used for tracking entry of different water sources to the stream. Groundwater sources may even be noted since it is frequently two or more degrees cooler. Final interpretation of the data is the responsibility of the user.

Equipment Needed

Level Two Survey Forms
Field notebook
Pencils
Maps, USGS quads and aerial photographs
50 meter tape measure
Abney level or clinometer
Camera with film
Minnow traps (3) and bait
Dip Net

AQUATIC SURVEY METHOD

Equipment Needed (cont.)

Fish measuring ruler (metric)

Range finder

Pocket altimeter

pH meter

Scientific sampling permit

Procedure. There are several phases of data collection for Level Two survey: preplanning before starting field work; field work broken down into data that is entered once for each survey area; data that is entered once at least every 100 meters along the stream; and office work to be done after the field work.

Preplanning and data collection before starting field work includes the following: Make required entries once for every survey area on the first part of the form.

- | | |
|--------------------|--|
| 1. Survey Areas | Use ADF&G numbering system |
| 2. Historical Fish | List the species observed or sampled by entering the appropriate species code. |
| KS - king salmon | DV - Dolly Varden |
| SS - silver salmon | RT - rainbow trout |
| RS - red salmon | CT - cutthroat trout |
| CS - chum salmon | SM - smelt |
| PS - pink salmon | ST - steelhead |
| NP - northern pike | BT - brook trout |
| CO - cottids | GR - grayling |
| LT - lake trout | BU - burbot |
| SB - stickleback | OT - other |

AQUATIC SURVEY METHOD

Data entered once per survey area. The following items should be recorded while at the stream once for each survey area.

<u>Item</u>	<u>Explanation</u>
1. Stream Name	Record the stream name as listed on the map or as commonly known.
2. ADF&G Catalog No.	Enter appropriate State Fish and Game Catalog number and sub-numbers for stream surveyed.
3. Latitude and Longitude	Record the latitude and longitude to the nearest five seconds for the lower end of the survey area. Use appropriate geodetic scale to interpolate precise latitude and longitude off a USGS quad. Identify the USGS quadrangle and legal description.
4. Agency Unit	Enter the appropriate land area code as assigned to each agency. 02 Stikine 10-19 BLM 03 Chatham 20-29 National Park 04 Chugach 30-39 State Park System 05 Ketchikan 40-49 F&WS 50-69 Native Corporations
5. Management Area	Enter the appropriate agency subunit code and VCU Number. (List of management area code to be developed and distributed by each agency).
6. USGS Map No.	List map number.
7. Aerial Photo No.	If an aerial photo is used, record the flight line, roll, photo, year and grid.
8. Bay/Drainage	Name bay or stream
9. Access	Enter up to two codes from this list: 1. Roaded (list road number) 2. Unroaded

AQUATIC SURVEY METHOD

<u>Item</u>	<u>Explanation</u>								
10. Present Land Use	Note any activities associated with man's present use or planned use such as logging, mining, roads, dump sites, etc.								
11. Historical Land Use	Note any evidence of historical land use such as logging (and approximate year), mining, abandoned cannery sites, etc.								
12. Stream Origin	Enter appropriate codes describing source of water at that point on the stream. <table> <tr> <td>1 - lake</td><td>4 - muskeg</td></tr> <tr> <td>2 - glacial</td><td>5 - surface runoff</td></tr> <tr> <td>3 - groundwater</td><td>6 - subsurface runoff</td></tr> <tr> <td>7 - other</td><td></td></tr> </table>	1 - lake	4 - muskeg	2 - glacial	5 - surface runoff	3 - groundwater	6 - subsurface runoff	7 - other	
1 - lake	4 - muskeg								
2 - glacial	5 - surface runoff								
3 - groundwater	6 - subsurface runoff								
7 - other									
13. Estimated Flow	Embodiment method.								
14. Flow Stage	Enter best estimate as to flow at time of survey. (See glossary for diagram of terms). 1 = low; 2 = normal; 3 = high								
15. Temperature	Hand-held thermometer to nearest degree C°.								
16. pH	pH, record to nearest .5 increment using a Universal Wide-range color wheel or electronic pH meter. The pH should be taken above the intertidal zone.								
17. Beaver	Note if beaver were present in the watershed.								
18. Temperature	A temperature sensitive stream is identified as a stream where water temperature will rise to undesirable levels if shade producing canopy is removed. Stream gradient (measured elsewhere), substrate composition (measured elsewhere) and stream water source are critical factors affecting temperature increases. Stream orientation (south-southwesterly orientated streams have the highest degree of susceptibility for adverse temperature changes) is also critical. Only streams between 55-57° latitude (Ketchikan to Sitka) need to be included in temperature sensitivity analysis since adverse increases have not been found to be present above 57° latitude (Sheridan 1977). Streams with average widths greater than 75 feet should also not be included, since the effect of tree shading is minimized as the stream becomes larger.								

AQUATIC SURVEY METHOD

<u>Item</u>	<u>Explanation</u>
19. Barrier	Note whether or not a barrier is present. Specifics listed in survey comments.
20. Weather Conditions	Enter the appropriate code from the key. If there is an unusual situation, enter in comments. 1 - rain 2 - clear 3 - overcast 4 - snowing 5 - fog 6 - partly cloudy
21. Intertidal Zone	An intertidal zone is defined as that portion of the stream channel between the high, high water mark (generally tree line) to the edge of the saltwater (if available, low, low water mark). If there is an intertidal zone within the survey area take the following data: A. Gradient in the intertidal zone measured with an Abney level or clinometer. Record to nearest .5 percent. B. Bottom Type: estimate % fines (2mm or smaller) % gravel/small cobble (2-128mm) % large cobble/boulders/bedrock (128mm+) the sum should equal 100% C. Available spawning area: estimate quality as poor, fair, good or excellent. D. Note yes or no whether schooling areas are present in the estuary or lower sections of the stream. If yes, describe in comments. E. If survey coincides with low tide, note yes or no shellfish potential, and if yes, describe in comments. F. Describe known anchorages, or ones used during the survey, and their exposure.
22. Comments	Add any comments that are important to the aquatic resources or required to answer other items on the list.
23. Investigators	Enter names of people doing the field work.

AQUATIC SURVEY METHOD

<u>Item</u>	<u>Explanation</u>
24. Date	Enter numerical designation of Month/Day/Year
<u>Photos</u>	Take one black and white print photo at each survey area and every readily identifiable change in habitat type, unique situation, barrier falls and the intertidal area. Photos will be taken facing upstream unless specifically noted in the photo records.
<u>Data Entered Once Every Section</u>	
<u>Reach</u>	Number each successive reach, defined as section of stream of similar gradient, substrate and bank type. Boundaries between reaches may be definite like a migration barrier, or they may be very subtle gradual changes of habitat.
1. Section Number	The stream is divided into sequential samples every 100 meters. Numbering should start at the furthest downstream point and increase consecutively upstream. Sections in the intertidal zone should be labeled with the code "I".
2. Section Length (m)	100 m. in length. Note if less than 100 m.
3. Compass Bearing	Sight upstream for bearing at start of section.
4. Gradient	Measure gradient over the section being surveyed with an Abney level or clinometer. Record to the nearest percent.
5. Water Quality	Enter appropriate codes from key: a. color: 1-clear 2-glacial 3-light tan 4-tan b. turbidity, record how deep you can see: 1-clear (no noticeable suspended material) 2-slight (noticeable suspended materials, bottom features are easily discernable) 3-turbid (suspended materials are not noticeable, bottom features are difficult or impossible to discern)

AQUATIC SURVEY METHOD

6. Bank Type Record lower bank type for left and right banks using key:
- A 1 GS-gently sloping (100%)
 - B or 2 SS-steeply sloping (100%-200%)
 - C 3 U-Undercut
7. Bank Stability Rating. Enter appropriate code from key left and right banks:
- 1-good stability--banks consist almost entirely (90%) of (1) soil with well developed vegetation cover/root masses and/or (2) exposed soil with high proportion (65%) of rock material and/or (3) bedrock. No evidence of active erosion.
- 2-fair stability--banks consist of (1) 50% of bank cover with well developed vegetation cover/root masses and/or (2) exposed soil with moderate proportion (40-65%) of rock and/or (3) 50% of the banks consist of bedrock. Evidence of some erosion within the last year exists.
8. Bank Vegetation Qualitatively describe the upland or upper streambank vegetation, other than the canopy, according to the following:
- 1-conifers (spruce/hemlock)
 - 2-hardwoods (alders)
 - 3-shrubs (salmonberry, blueberry, etc.)
 - 4-forbs (skunk cabbage)
 - 5-grasses/sedges (muskeg)
9. Debris Loading Percent area covered by debris. Indicate whether the debris is composed of small (10 cm diameter) or large (10 cm diameter) materials. This includes both suspended and submerged debris.
10. Undercut Banks Record length of undercut bank (in meters) for each bank.
11. Water Width A) record active channel width to the nearest 1/10 meter.
- B) Record water width to the nearest 1/10 meter. Width of multiple channels

AQUATIC SURVEY METHOD

11. continued should be recorded separately
- C) Identify (1) channel braiding
(2) back-water sloughs and
(3) off-channel areas.
12. Water Type. Partition each section by indicating the percentage of each of the following water types:
- SS- shallow (50 cm deep)
slow (30 cm/sec)
- SF- shallow (50 cm deep)
fast (30 cm/sec)
- DS- deep (50 cm deep)
slow (30 cm/sec)
- DF- deep (50 cm deep)
fast (30 cm/sec)
13. Substrate Indicate the percent of each stream bottom substrate type according to the following:
- (1) boulders (250 mm, 10")
(2) cobble (65-250 mm, 2.5-10")
(3) gravel (2-64 mm)
(4) sand (0.1-2.0 mm)
(5) organic muck
(6) other, coded as (a) bedrock (b) sunken log (c) other
14. ASA/Quality Percent available spawning area.
- Indicate gravel quality as:
- (1) compact
(2) moderate compact
(3) loose
15. Rearing Area % Within the section, the percent of rearing type cover is estimated to give a total of pools, undercut banks and suitable habitat.
16. Pool Cover % The percent of riparian vegetation hanging over the pools within the section.

AQUATIC SURVEY METHOD

17. Riffle Cover % The percent of riparian vegetation hanging over riffles within the section.
18. Fish Observed The species of fish is indicated and presence or absence noted by yes or no or the observer may indicate relative numbers per section.
19. Fish Sampling Enter yes or no if traps were set in the section. Fill out form to show catch data.
20. Potential Barriers Enter yes or no if a fish migration barrier is present. If yes, record the type of barrier.
- | | |
|--------------|--------------|
| 1-velocity | 4-beaver dam |
| 2-falls | 5-manmade |
| 3-debris jam | 6-other |

Photograph the barrier.

21. Enhancement/Rehabilitation Enter yes or no as to potential for stream improvement work and discuss in narrative.

Office Work Done After Fieldwork. After completing fieldwork, the following things should be done to the data in the office.

1. Diagrammatic Map Draw a single line schematic map using the information from the survey. The scale should be 4" to the mile at a minimum. One way to do it is trace the streamcourse over an aerial photo, then mark on the map:
- a. Notations marking boundaries of the 100 m. sections.
 - b. Upper limits of spawning area if known.
 - c. Barriers.
 - d. Upper limits of anadromous habitat if known.

AQUATIC SURVEY METHOD

1. Diagrammatic Map (cont.)

- e. Obvious soil hazard conditions such as V-notches, slumps, mass wasting, blue clay, braided stream channels and windthrow areas as they relate to the stream.
- f. Water flow direction.
- g. Where all tributaries enter.

2. Narrative

Write a general narrative highlighting:

- a. Special entries on the diagrammatic map.
- b. Summarizing anything unusual from the comments section.
- c. Generalize about the quality of spawning and rearing habitat.
- d. Explain any deviations from the prescribed survey procedure.

3. Photos

- a. Mount photos on paper and type a clear legend under each one. Include in the legend:
 - (1) date
 - (2) survey area by river mile
 - (3) section number
- b. Establish a filing system for the negatives.

4. Binding

Arrange forms and photos for an entire stream or survey area into a booklet. Put narrative first, then schematic map(s), forms in sequential order with its accompanying photos. If the stream is divided into survey areas, arrange all forms relating to section A first, followed by B, etc.